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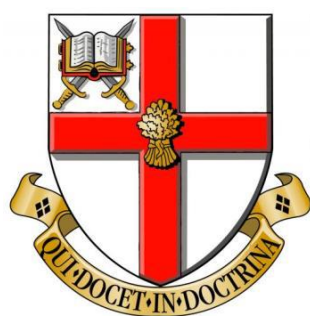
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University of Chester

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Declarations

This work is original and has not been previously submitted in support of a degree or other qualification.

Material drawn from other sources, published and unpublished, is fully acknowledged.

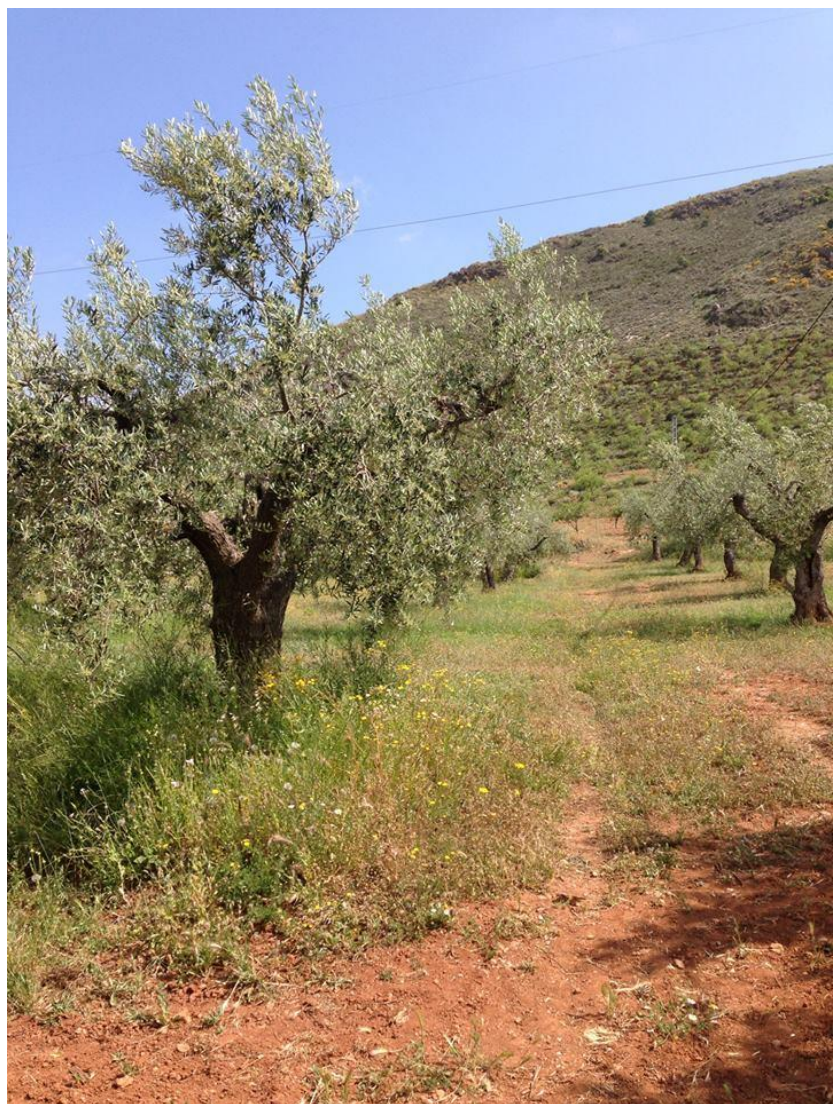
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Efficient Agriculture: Sustainable organic olive oil production in Almería Province; Smallholder Perspectives



Organic olive-oil orchard near Laujar de Anderax, Almería Province (Source: Author's own Photograph)

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UNIVERSITY OF CHESTER

Abstract

The survival of smallholder olive-oil producers is a growing concern for the European Union. Despite subsidies (such as single farm payment), competition from intensive producers and increasing operating costs results in abandonment or a change to intensification which has long term negative environmental impacts. This dissertation explores ways to provide useful information to aid smallholder survival in Almería Province. Through interviews with smallholder producers, a review of relevant literature, and a case study of best practices in sustainable olive-oil production from Oro del Desierto, this research produced a useful finding; organic production is economically viable in the long term therefore is a potential adaptation option for survival over intensification of production. If smallholder growers produce high-quality extra virgin organic olive-oil, and employ effective marketing strategies and sustainable practices, their methods can be economically viable as they sell to a growing niche market. Additionally, organic production offers many environmental benefits such as increasing biodiversity.

Table of Contents

Abstract	ii
Table of Contents	iii
Figures	v
Tables.....	v
Plates	v
Abbreviations	v
Acknowledgements	vi
1. Introduction Chapter	1
1.1 Historical Background.....	1
1.2 Olive Oil Industry	3
1.3 Research Focus	5
1.4 Objectives and Research Aim	6
2. Literature Review Chapter.....	8
2.1 The United Nations; <i>spotlighting sustainability</i>	8
2.2 Agriculture and Sustainability	9
2.3 Olive Oil Industry	13
3. Research Methods.....	17
3.1 Introduction.....	17
3.2 Research Strategy	17
3.2.1 Grounded Theory	18
3.3 Data Collection	19
3.3.1 Pilot Study.....	19
3.3.2 Oro del Desierto	19
3.3.3 Smallholder Interviews.....	20
3.3.4 Recording Interviews and Multimedia Technology.....	21
3.4 Framework for Data Analysis	22
3.5 Limitations and Potential Problems	23
4. Case Study: Oro del Desierto and Organic Olive-Oil.....	25
4.1 Introduction.....	25
4.2 Principles of olive-oil production.....	25
4.2.1 Unsustainable olive oil production: “ <i>The good, the bad and, the ugly!</i> ”	26
4.2.2 Sustainable olive-oil production: case study Oro del Desierto	28
4.2.3 Organic production.....	31

4.2.4 Subsidies	32
5. Empirical Research Findings: Description, Analysis and Synthesis.....	33
5.1 Introduction.....	33
5.2. Discussion	33
5.2.1 The intensive vs. traditional & organic debate.....	35
5.2.2 EU Subsidies.....	39
5.3 Summary.....	42
6. Conclusion and Recommendations	44
6.1 Introduction.....	44
6.2 Research Objectives: Summary of findings and conclusions	44
6.3 Recommendations.....	47
6.3.1 Farm level	47
6.3.2 Regional Level.....	47
6.3.3 Governmental Level	48
6.3.4 Suggestions for future research	49
6.4 Contribution to knowledge	49
6.5 Self-Reflection	50
7. Reference List	51
8. Appendices	I
Appendix 1. Interview Questions and Informed Consent	I
Appendix 2. Interview Transcripts.....	III
1. Rafael Alonso Aguilera, Oro del Desierto; Tabernas	III
2. Rafael, Almazara de Lubrin; Lubrin.....	XIV
3. Paco Fransisco; Sorbas	XXI
4. Justo Sanchez Martin, Cortijo el Cura; Laujar de Anderax	XXVII
5. Andreas; Lucar	XXX
6. Jaun; Uleila del Campo	XXXIV
Appendix 3. Almería Map	XLI
Appendix 4. CAAE guide on organic farming.....	XLII
Appendix Risk Assessment	LIV

Figures

Figure 1. Olive Branch of peace on a civil war statue, Barcelona Spain.....	2
Figure 2. Andalusia is Spain's largest olive-oil producing region.....	4
Figure 3. Oro del Desierto Estate.....	29
Figure 4. CAAE Andalucía organic Logo.....	32

Tables

Table 1. Olive-oil production per region and country.....	3
Table 2. Olive-oil increase 1990/1 - 2004/5.....	14

Plates

Plate 1. Traditional mountain groves, near Níjar village.....	26
Plate 2. Irrigated intensive olive groves, Tabernas desert.....	27
Plate 3. Plate 3 Traditional plain groves at Oro del Desierto.....	28
Plate A. Solar Photovoltaic Panels.....	29
Plate B. Purpose build reservoir.....	29
Plate C. Drip feed irrigation before burial.....	29
Plate D. Museum and Restaurant.....	29

Abbreviations

CAP	Common Agricultural Policy
EU	European Union
FAO	Food and Agriculture Organisation
GM	Genetically Modified
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
IOC	International Olive Council
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNMDGs	United Nations Millennium Development Goals
WHO	World Health Organisation

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1. Introduction Chapter

This chapter familiarises the reader with the relevant information on the background content of this research and discusses exactly where the research focus will be, providing a succinct summary over the overall research aim and individual research objectives.

1.1 Historical Background

For thousands of years the olive tree has been inextricably linked with the very fabric of life in the Mediterranean. The olive tree is native from Asia Minor and spread from Iran, Syria and Israel to the rest of the Mediterranean basin, 6000 years ago (Cimato & Attilio, 2008). Olive-oil has integrated and identified itself within Mediterranean populations culturally, and economically (Scheidel & Krausmann, 2011). As this cultural heritage dates back thousands of years, it is no surprise that there links in the wider society today; the universal symbol of peace that the United Nations Peacekeeping Force use is an olive branch, the branch is also on the Cypriot flag, it adorns statues (see figure 1), coins and so on. The cultivation of olives influences large areas of rural landscapes, for example orchards on mountainous terraces, are seen as an agro-ecosystem, a Mediterranean forest where migratory birds, pollinators and a rich plethora of flora coexist (Loumou & Giourga, 2003).

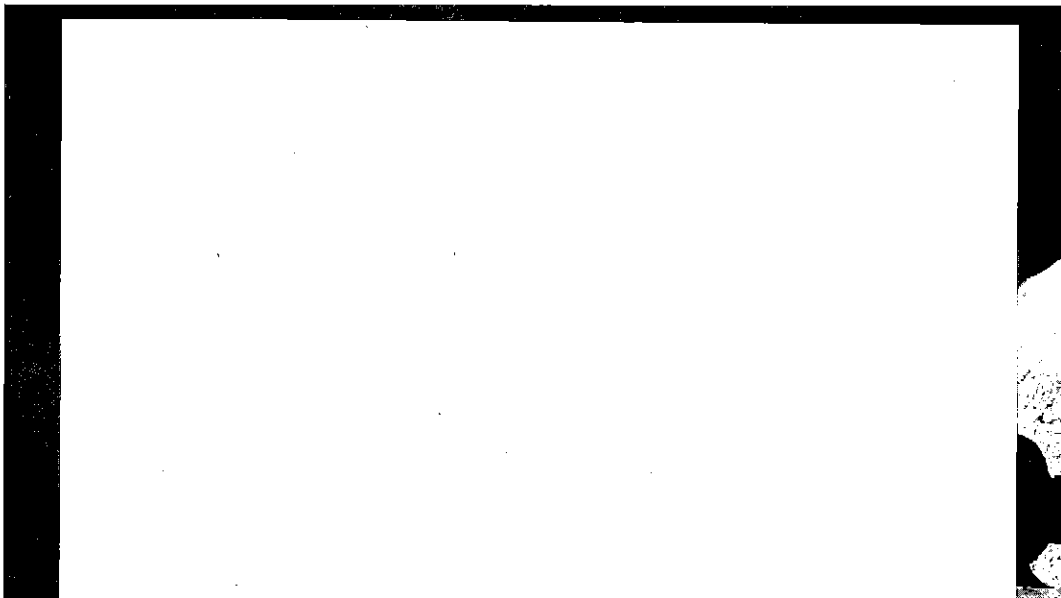


Figure 1. Olive Branch of peace on a civil war statue, Barcelona Spain (Source: www.mintpressnews.com)

Early cultivation practices typically involved an approach to farming that mirrors ecosystem around it in the form of mountainous terraces (see plate 1). A system of farming which not only uses the topography of the land to maximise water catchment, but one where organic matter is used to build and maintain a soils fertility. This system of growing depends fully on the ecosystem that sustains it; great pains are taken to reduce the risk of disease by maintaining tree varieties, and preventing a monoculture, whilst maintaining a rich level of biodiversity so that ecological balances can remain (Rossiter, 2012). This being said, traditional cultivation practices require manual labour, especially in the harvesting seasons of October and November where each olive has to be individually picked from the tree. However, in rural nucleated villages, a shortage of labour is not an issue during these 'winter' months, in fact the economics of employment and helping family members represents a pull factor itself.

The scale on which traditional olive-oil cultivation occurred in ancient times and up to the mid-20th century is an important issue to consider. Typically, most of the rural populations in Spain, and elsewhere in the Mediterranean basin, would live in villages and small towns, therefore semi-subsistence farming was dominant, and any excess production would filter into localised economies or to ports and trading routes (Hitchner, 2002). Although an extensive history of olive-oil exists, it is only recently in historic terms that the globalised promotion of the "healthy Mediterranean diet" (Ness, 2002, Nestle, 1995, & Quiles, Ramirez Tortosa, & Yagoob, 2006, Corella, Carrasco, Sorli, & Estruch, 2013) has led to an increase in demand for this product (Scheidel & Krausmann, 2011). In developed nations, specifically in Europe, and North America, the threat of a poor nutritional diet can and is leading to serious public health issues such as obesity and type 2 diabetes and result in severe socio-economic costs for governments to tackle. Set this in the context of an age of convenience and affordable junk-food, and the argument for promoting healthy food sources is of a clear necessity to the maintenance of good public health (Wyatt, Winters, & Dubbert, 2006).

1.2 Olive Oil Industry

Today, the olive tree still plays a vital part in the Spanish agricultural sector and export economy; Andalusia being the largest single producing area (see figure 2). Spain is the largest producer of olive-oil, by such an extent that even the combined production of Spain's two closest competitors Italy and Greece falls short of Spanish production (see table 1). The International Olive Council (IOC) is an intergovernmental organisation and is responsible for defining quality standards and monitoring authenticity, it lists four major grades of commercial olive-oil, in ascending order of perceived quality; Extra-Virgin, Virgin, Refined, and olive-oil (IOC, 2013).

Region/Country	Production in tons (2012)	Production % (2012)
World	2,903,676	100%
European Union	2,004,481	69%
Non EU	899,195	31%
Top Producers by Country		
Spain	992,000	34.2%
Italy	570,000	19.6%
Greece	351,800	12.1%
Turkey	206,300	7.10%
Syria	200,000	6.8%
Tunisia	192,600	6.6%
Morocco	130,000	4.5%

The market for olive-oil is diverse; consumption is highest in Greece, Italy and in most Mediterranean basin countries, however emerging markets such as; Japan, the United States, China, Russia, and Brazil, are a tied with new growth opportunities for Spanish farmers (Bautista, 2011).

Table 1 Olive-oil production per region and country (Source: <http://faostat.fao.org>)

This emerging market may well prove beneficial for European olive-oil producers; job creation, increased domestic and overall European Union (EU) exports, and taxation, however the economic benefits should not come at the expense of the environment and the people that sustain production. The increase demand will certainly raise questions of sustainable development, after all; more production equates to greater demands for water, energy (renewable or otherwise), and pressures on soil quality. Additionally, if olive-oil production is based on a mechanised system with low employment levels, issues of safeguarding rural employment are raised. If this industry is to grow and maintain its production in the long term, it must be durable; economically, socially and environmentally.

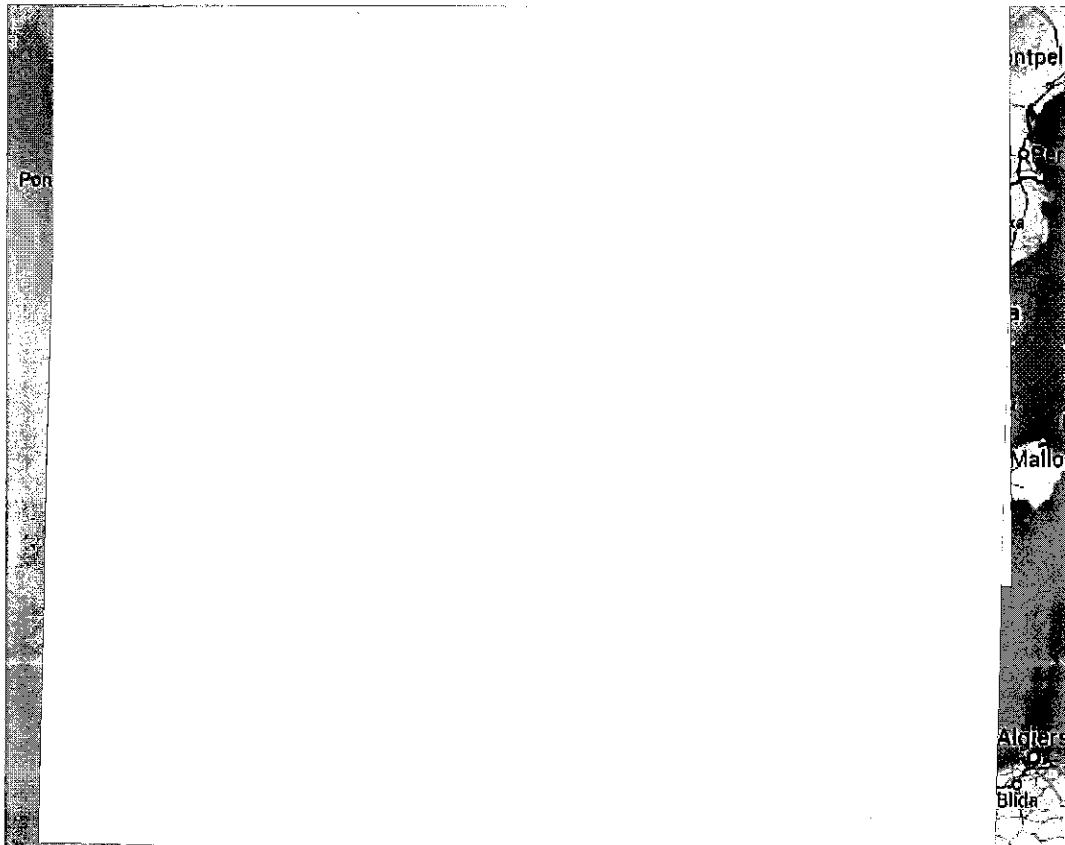


Figure 2 Andalusia (marked within the red dotted line) is Spain's largest olive-oil producing region (Source: <https://www.google.co.uk/maps>)

With the current financial crisis and a fluctuating price of fossil fuel based products, on which much of the world's agriculture is heavily dependent upon, comes the need for EU subsidies. Spain's olive-oil sector is currently subsidised to the tune of 40%, this helps to safeguard production, employment and the rural economy, and ensures land is not abandoned (Butler, 2012). However, in the light of the recent financial crisis, there is a need for governments to become even more accountable of where public money is spent. When linking this to the need to be current environmental sustainability trends, it is at least plausible to consider the possibility of this funding being cut or reduced for the use of unsustainable intensive production systems, if this is so how can smallholder producers, who depend upon subsidies to be cost-effective continue to farm?

Chapter 3 – *Oro del Desierto* - provides a case study of sustainable olive-oil best practices and provides an outline summary of the organic olive-oil market including the two major subsidies olive-oil farmers receive.

1.3 Research Focus

In the context of agriculture and food security, serious issues are being raised concerning; the safeguarding of rural employment, maintenance of public health, the need for environmental stewardship, and the preservation of cultural identity. Furthermore, the dispute between economical suitability of traditional vs. intensive agriculture is both a Spanish and multinational debate. With these issues in mind, it is convenient to have the benefit of a thoroughly researched United Nations (UN) global assessment of the state of agriculture: the International Assessment of Agricultural Knowledge, Science and Technology for Development, 2008 (IAASTD). This comprehensive study, co-sponsored by the Food and Agriculture Organisation (FAO), World Health Organisation (WHO) and the World Bank concludes that unless agriculture, and the way society engages with food, agriculture, livestock production and fisheries, is fundamentally changed, it will not be possible to feed the projected 9 billion world population in 2050, meet the UN millennium development goals, and ensure equity and sustain the planet (IAASTD, 2008). The IAASTD found that agro-ecological approaches to farming will contribute greatly in tackling these serious issues mentioned, while maintaining and increasing productivity. An aspect of the IAASTD findings which supports the rationale for further research is the need to reconnect the disconnections between agriculture and environmental sustainability, between customers and food providers, and between policies and their expectations (UKABC, 2010). Therefore it is appropriate, and justifiably understandable, to investigate an approach to food production which helps to redress the very important issues mentioned in the opening sentences of this paragraph.

This report will investigate the topical area of smallholder, organic olive-oil production, specifically in Almería province, South East Spain. The report will investigate what challenges these smallholder farmers are facing, specifically the drivers and barriers to success, whilst capturing the essence of the time, or zeitgeist. This will also help to clarify how smallholder producers continue to exist, whilst investigating what constitutes as a threat to their survival, whilst highlighting their importance.

To be effective, sustainable efforts must be based on sound best practice examples from relevant case studies, rigorous empirical enquiry and a thorough analysis of the challenges facing their implementation. By informing researchers, practitioners, and policy makers with appropriate research, with recommendations and options, informed decisions can be made on future actions. The challenge is in providing the evidence that adopting sustainable practices which encompass environmental stewardship, promote social enterprise initiatives, and continue to generate a financial profit, is fit for purpose. Therefore rejecting the inherently unsustainable business-as-usual situation we find ourselves in. This is an essential philosophy that decision makers, practitioners, and even consumers must adopt in order to help create a sustainable future.

Critical to the value and logic of the research in this study is the need to interview smallholder farmers in Almería province so that first hand perspectives on sustainable organic olive-oil production can be obtained. Furthermore, in order to help encourage a greater uptake of sustainable agricultural systems, a literature review will need to support farmers' perspectives and situate their views in the context of other research. This will help validate farmer's opinions and blend micro level perspectives with published research and policies, and therefore make the results of this research more reliable, thus useful.

1.4 Objectives and Research Aim

The overall aim of this research is to provide useful information of the dynamics behind sustainable smallholder olive-oil production in Almería Province in order to help ensure their survival.

Specifically, within the context of food security and sustainability, the objectives of this research are to:

1. Identify the forces driving the need for sustainable agricultural practices
2. Critically evaluate the merits and shortcomings of traditional vs. industrial/intensive olive oil production
3. Explore smallholder olive-oil producer's views and practices related to sustainable/organic systems, including drivers and barriers
4. Formulate recommendations to help foster greater sustainable olive oil uptake in favour of intensive production methods

The value and purpose of the objectives are as follows; objectives 1 and 2 will focus on emerging issues, offering relevant topical insight and to help 'set the scene', whereas it is in objectives 3 and 4 that contributions to the wider literature of sustainability and sustainable agriculture will be made.

Objective 1 - *forces driving the need for sustainable agriculture* - will initially cover the wider need for sustainability initiatives, the thinking behind why it is important to act in a sustainable manner. Primarily, it will investigate how we have reached the viewpoint that business-as-usual must be rejected in favour of more durable options. Secondly, what are benefits of adopting such a view point? An example of such a benefit may be that policy makers can plan ahead to prevent greater expenditure and relieve potential pressures of tomorrow. Objective 2 - *a critical evaluation of traditional vs. industrial/intensive olive-oil production* - is of relevance for constructing a balanced argument on which to base any recommendations, thus preventing an ill-informed, bias in favour of one option. Objective 3 - *the smallholder perspectives* - will give an insight into the minds of the farmers growing traditionally; their challenges, successes, how they would like to benefit from any EU subsidies, and see what they perceive is vital for their survival. Finally, objective 4, - *formulating recommendations* - will help to, with the aid of the literature review and data collection (interviews and case study), give options on what steps can be taken to aid smallholder olive-oil producers. These objectives should be viewed as interconnected, and all pertinent in achieving the overall aim of this research project; *'to provide useful information of the dynamics behind sustainable smallholder olive-oil production in Almería Province Spain, to help ensure their survival'*.

Research into smallholder olive-oil producers, adopting so called agro-ecological processes, could well address some urgent issues and lead to an overall method of producing food which is fit for purpose in the challenging circumstances of 21st century. In addition, interdisciplinary academic journals have also called for papers that involve 'Environment and sustainability management', for example the journal of Accounting & Organizational Change (Emerald, 2013). Apart from the academic need for sustainable business case studies, policy makers and practitioners will benefit from this report as it can act as a catalyst for transition from unsustainable to sustainable olive-oil production system. It is worth noting that the definition of what constitutes as sustainable olive-oil production system is defined and explained in the case study of Oro del Desierto in Chapter 4.

2. Literature Review Chapter

This chapter has been researched with the aim of achieving objective 1 and 2;

1. *Identify the forces driving the need for sustainable agricultural practices*
2. *Critically evaluate the merits and shortcomings of traditional vs. intensive olive-oil production*

When researching the myriad of issues surrounding agriculture it is easy to see that our food production is a complex system of interrelated issues encompassing the economic, social and most importantly the environment. Therefore this literature review will endeavour to succinctly summarise the most pertinent issues with the aid of works related to sustainable agriculture, specifically olive-oil production. The purpose of conducting a meaningful discussion and analysis of the wider issues relating to sustainability and agriculture greatly aids in the successful completion of the overall aim. Agricultural related policies, major research, and other dependable sources, will complement the introduction chapter and the successful completion of research objectives 3 and 4.

2.1 The United Nations; *spotlighting sustainability*

The Brundtland Commission (1983) was the first UN General Assembly (38/161) to comprehensively look at critical environment and development challenges, thus bringing these issues into the international spotlight (Langhelle, 1999). The former Prime Minister of Norway, G.H. Brundtland, who chaired the Commission, defined sustainability as “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”, (Brundtland, 1987) or in other words; keeping things going continuously overtime. This definition implied that there were necessary limits, limits on the ability of the biosphere to absorb the effects of human activities and is an likeness with *Small is Beautiful: A study of Economics as if People Mattered* by E.F. Schumacher (1973).

Schumacher's 1970s philosophy, that the modern economy is unsustainable, and that natural capital, such as fossil fuels, are treated as income rather than (renewable) capital is as relevant as ever in the 2010s. Schumacher goes on to argue that governments must play their part in sustainable development in order to prevent social and economic breakdown via environmental catastrophes. *Our Common Future* (Brundtland, 1987), the report at the end result of this comprehensive United Nations Commission, substantiates Schumacher's views, proclaiming that "Humanity has the ability to make development Sustainable", however if this is the case, why is it that 25 years later these issues still persist? If humanity has the ability, why is the paradoxical sustainable development not sustainable? Does multilateralism need to be more focused towards businesses? Or is it the case that so many of the pressing issues are out of sight and therefore out of mind for so many? Or perhaps simply our market led economy is to blame.

Perhaps out of sight therefore out of mind is not the issue, since Brundtland raised such pressing issues the United Nations Conference on Environment and Development (UNCED) has had; *Agenda 21*, at Rio Earth Summit, 1992, and the subsequent *Rio+5*(1997), *+10*(2002), and *+20* (2012) each updating and reaffirming the need for sustainable development. In addition to Agenda 21 there have been numerous UN conferences, summits, and meetings, that highlight progress and action plans of these issues for example; *COP 15* (UNFCCC, 2010). However the outcomes of these meetings have varying degrees of success.

2.2 Agriculture and Sustainability

The first large scale concerted effort to raise awareness of major challenges facing food production and bring such issues as food security into mainstream thinking were voiced by the United Nations. Agricultural practices play their part in the deconstructing of the natural environment; however there is a continuing discussion of its role in creating a sustainable future. There is an abundance of literature and bodies to support social, environmental and economic merits of sustainable agricultural practices for example *Intergovernmental Panel on Climate Change Report* (IPPC, 2007), *Millennium Ecosystem Assessment* (MA, 2005), *The Economics of Ecosystems and Biodiversity* (TEEB, 2008). However most notably is the United Nations (World Bank) *International Assessment of Agricultural Knowledge, Science and Technology for Development* report in 2008 (IAASTD, 2008).

The IAASTD report comprises of one global and five sub-global reports that provide evidence for the integrated analysis of the main concerns necessary to achieve development and sustainability goals, such as the UN millennium development goals (UNMDGs) (UNMDGs, 2013). The project developed out of a consultative process involving 900 participant researchers and 110 countries and assessed the question how can Agricultural knowledge, Science and Technology be used to reduce hunger and poverty, improve livelihoods, and facilitate equitable environmentally, socially and economically sustainable development (IAASTD 2008).

Amongst other conclusions, the report concludes that local food systems, known to sustain livelihoods at micro level, could well be one of the most appropriate ways to secure food security and maintain a sustainable development trajectory. However, such local food systems are currently challenged by current globalised food systems. Scoones (2009) points out that this study is inclusive and participatory in design and process, allowing alternative voices to be heard, specifically the perspectives of smallholder farmers, and is in his opinion essential to generate a generic understanding of global issues. This resembles the interviews conducted in this research which will be discussed later.

A debate that is crucially importance to this research is how we ensure food security in the long term, The UNCED has highlighted the challenging situation we find ourselves in and the IAASTD has provided the world with options and recommendations, however the debate persists on the different components of ensuring sustainable and equitable food production, with a population approaching 9 billion by 2050 (Godfray, Charles, Beddington, Crute, et al, 2010).

Now that the need for sustainable agriculture has been established, it is vital to point out some of the main issues that need to be addressed by governments and businesses. Chiefly, there is growing concern with regards to the uncertainties about the ability to sustainably produce and access sufficient food, (Schmidhuber & Tubiello, 2007, Barrett, 2010). Pimentel & Pimentel (2006) warns that if we are approaching a population of 9 billion by 2050, food insecurity will likely become a reality if we do not actively conserve croplands, freshwater, energy, and biological resources. It would be a shame to labour these points without taking into consideration the current food wastage in developed nations.

Schaffnit-Chatterjee (2009) strengthens this consideration in stating Europe wastes up to 30% of all food purchased, along with the wasted energy, water, transportation, fertilisers, and resulting methane from the waste decomposition.

Therefore it appears that Schaffnit-Chatterjee's input unveils even larger issues at play. Consequently, it may be more fitting to suggest that it is not more food that needs to be produce, but rather more efficient use of existing croplands (Tillman, Blazer, Hill, & Befirt, 2011), better food education/ behaviour change for the consumers (Parfitt, Barthel, & Macnaughton, 2010, Wirsenius, Azar, & Berndes, 2010) and more commitment by supermarkets to reduce their waste foods (Smithers, 2013).

A further issue surrounding food production is the uncertainties about world food prices (Dorward, 2013). Mitchell (2008) prompts us to pay attention to the contribution of biofuels and the 2007 spike on global food prices, and assumes that an increased demand for biofuels had a large part to play in global shortages. Rosegrant (2008) substantiates this claim but adds prices are also due to higher oil prices, combined with speculative trading, and demand for feedstock. Harvey & Pilgrim (2011) complains that biofuel substitutes are just causing even greater competition on land, increasing environmental pressures. Searchinger, Heimlich, Houghton, et al, (2008) also raises concern for biofuel use stating a nearly double emissions rate (including land use) than fossil fuels (Searchinger, Heimlich, Houghton, et al, 2008).

In addition to biofuel demands, authors attribute rising prices to an increased demand for food by developing countries such as China and India, whose populations are seeing the most increases, thus pushing food prices higher (Kearney, 2010), however this is contradicted by a recent FAO (2011) report on food price security that states this is not the case. In any case, the fact that food prices are so volatile, and are at the mercy of a fluctuating price of oil, provokes the thought that food producers should take sufficient steps avert this volatility by developing a system of food production that was not so dependent on the use of fossil fuels.

As noted above in the developed world we live with plenty, yet in developing nations there is hunger and malnutrition. The question is how do we tackle such issues? one study suggests that Genetically Modified (GM) crops claim to provide the answer to malnutrition in developing nations and is bizarrely quoted as a “sustainable agricultural strategy” by Bouis & Welsh (2009), Yet the IAASTD (2008) implies that it is hardly ‘sustainable’ or even fit for purpose to ensure food security in the hands of the companies who produce GM crops, or who own the rights to their production (FAO, 2004). This would lead to whole societies utterly dependant on these GM crop varieties to meet their dietary needs, thus self-sufficiency is not an option. On the other hand, in developed and emerging nations, obesity is a growing concern for policy makers as it is a real danger for public health (Wyatt, Winters, & Dubbert, 2006). Ball & Crawford (2006) acknowledges this fact but suggest that diet is not the real issue; rather the general low socio-economic status is to blame and a general age of convenience. Drewnowski & Specter (2004) also argue that low income is a deciding factor stating that low cost energy-dense foods are “more affordable than prudent diets based on lean meats, fish, fresh vegetables and fruit”, however this is in contrast to their concluding statement that more Americans are becoming overweight, whilst spending lower amounts of disposable income on food (Drewnowski & Specter, 2004). This conclusion seems to be a generalisation when considering the population of the United States and the multiple reasons for becoming overweight, for example the wider dynamics of the psychology of the consumer plays a huge part in other researchers debates (Janssen, 2013, Greener, Douglas, & Van Teijlingen, 2010).

The above are very pertinent issues, and of course the list is not comprehensive, however with these few issues and themes in mind it would be an astute move by farmers, fishermen and growers, policy makers, and as importantly the consumer, to decrease the dependence on fossil fuels, and to adapt our food production to reduce unhealthy diets becoming the low cost norm or even the uncontrolled for those less fortunate. Research also suggests that subsidies should be only given to growers and farmers who practice sustainable production, Tilman, Cassman, Mayson, Naylor & Polasky (2002) conclude in their paper on *Agricultural Sustainability and Intensive Production Practices*; “agricultural subsidies in the United States, EU and Japan redirected to reward sustainable practices”. This would make perfect sense as policy makers want to encourage sustainable practices, a fantastic way to gain confidence from farmers who are concerned by profit losses by adopting new agro-ecological approaches.

2.3 Olive Oil Industry

The olive-oil industry provides employment, trade, and olive tree plantations are one of the Mediterranean's defining landscaping features. Given the historical prevalence of olive-oil in Almería province, and its role in the Mediterranean diet, olive oil is of significant cultural importance. With this importance in mind, research into olive-oil production highlights a whole raft of industry specific economic, social, and environmental challenges, trade-offs and contradictions in terms of production methodology; intensive vs. traditional.

Olive-oil production can be easily divided into two distinct cultivation methods; traditional, smallholder producers, who typically grow organically with tree density of less than 140 per ha. The second cultivation method by contrast is intensive, industrial producers, who typically grow non-organically, high density (more than 140) trees per ha. Although there are different types mixed production methods such as semi-intensive, organic but on a large industrial scale and so on. However for convenience sake, and to avoid pedantry, these two differing cultivation methods will be used in this section of the literature review to discussing methods (Gómez-Limón, Picazo-Tade & Reig-Martínez, 2012).

The International Olive Council (IOC) state in their annual report the need to obtain *“better knowledge of olive industry infrastructure in the member countries is key to proper strategic planning”* and that *“This will help to shed more light on how the olive sector works and to target priorities in order to propose the necessary support”*. This then speaks again to the need for research in this area (Emerald, 2013); when major intergovernmental organisations such as the IOC have such research they can use it to influence policy maker's decisions. For example the 2005 International Agreement on Olive-Oil and Table Olives paper which introduced unilateral agreements on standard setting, for example sustainable irrigation systems.

Demand for olive tree products, both olive-oil and olive fruit is steadily increasing worldwide; the IOC indicate that consumption rates of olive-oil have increased considerably over the past decade (see table 2). This increase in demand presents a clear business case for supporting the olive-oil industry.

Country	1990/91 (tonnes of olive-oil consumed)	2004/2005 (tonnes of olive-oil consumed)	% Increase
Japan	4,000	32,000	700
Canada	10,000	32,000	220
USA	90,000	221,000	145

Table 2 Olive-oil increase 1990/1 - 2004/5 (Source: IOC, 2013)

Cimato and Attilio (2008) argue that this demand is mostly interested in top-quality, high priced olive-oils, presenting thus a considerable consuming potential. Their report goes on to support earlier the discussion concerning health properties and state that the new markets but also suggests that the growth is due to better marketing strategies and industrialised production methods. It is also widely cited that the main channel in which olive-oil is retailed in the domestic market is through large retail chains and supermarkets (Pomarici, & Vecchio, 2013). Again this increase in production is financially attractive, and highlights the potential economic rewards available to businesses and governments, however the increase in production should not come at the expense of the communities and environments that support it. In other words, if this boom is to avoid a bust period, environmental stewardship must be applied along with making the industry socially viable.

When reviewing published works on smallholder producers in the EU, a clear question emerges; how can smallholder production remain profitable? Potential solutions to the plight of the smallholder producers are numerous and often involve intensification.

Yet research also indicates that marketing channels play an important role in the competitiveness of agribusiness value chains (Sousa Fragoso, 2013). In addition the United Nations Environmental Programme's Fourth Global Environmental Outlook (2007) states that Land degradation through intensive production methods lead to decreasing agricultural productivity, resulting in lower incomes and reduced food security (UNEP, 2007). Some researchers adamantly claim that public-private partnerships operating on a symbiotic basis plays an important role in supplying financial assistance for growers in order to satisfy the market demands (Suli, Bomaj, Suli & Xhabija, 2013).

It is most probably the case that solutions to the profitability issue will come from a combination of approaches, nevertheless it appears that a shortcoming of smallholder production is that it is not financially viable unless support in the form of subsidies is present or the product is marketed effectively and of high-quality.

There is evidence to suggest that traditional practices such as; efficient water harvesting in reservoirs, natural organic fertiliser, and botanical insecticides can seriously reduce operating costs when comparing intensive alternatives over the long term (Isman, 2006, Molden, 2007). If so, why it is that production systems do not always employ such methods. Gómez-Limón (2010) informs us of the loss of biodiversity, loss of traditional agricultural landscape is a growing concern; traditionally olive groves used to be the dominant production system, coexisting with other crops such as pastures, vineyards or cereals, by contrast now the upward trend is an intensively produced system where the only living species year round is the olive grove.

There is a general agreement in the literature that the Common Agricultural Policy's (CAP), Europe's overall agricultural plan, direct payments (subsidies) should be changed to remove the outdated logic of compensation (De Graaff, Kessler, & Daurte, 2011, Bureau & Mahé, 2009, Buckwell, & Tangermann, 1999). Reforms in the CAP have encouraged changes in land management and farming by removing environmentally harmful subsidies which focused on maximising production (Schmid, Sinabell & Hofreither, 2007). However one recent study concludes that on the basis of EU policies tailored to favour intensive production of olive-oil, traditional farming methods are not as productive as they once were. The report adds that the low-intensive, traditional farming practices smallholder farmers exhibit, offer a high level of environmental stewardship however are abandoned when uneconomically viable (Duarte, Jones, & Fleskens, 2008).

Future predictions for agricultural systems suggest that the EU is focusing on an action plan for the olive-oil sector that focuses on strengthening the competitiveness of the sector by using all possibilities not solely relying on strengthen world market demand for EU olive-oil by encouraging production of a high quality product for the benefit of growers, traders and consumers (EC, 2013). The EC action plan for olive-oil indicated that production extends to 17 countries outside of the EU, and also that the demand for olive-oil is far reaching and increasing.

The report's findings concluded that supply currently exceeds demand in the EU however demand remains strong worldwide, therefore the EU is in a privileged position when it comes to promotional activities with high returns on investments (EC, 2013). This also speaks to previous research that discusses the option of increasing the marketing of high-quality product and also introduces the impression that it is not more production that is needed, rather a more quality. Gámez, Hernández & Poyatos, (2013) offer this conclusion regarding the Implications of the CAP 2014-2020 for the Olive-Oil Sector; "The traditional Spanish olive sector in particular and especially in the case of the Andalusian, where much of the net income of farmers comes of aid implemented by the CAP, start living a critical situation for the six years 2014 - 2020, therefore requires urgent measures and strategies to ensure and guarantee their survival". Therefore strengthen the need for farmers to become economically self-sufficient.

A final point worth noting in this section of the Literature Review, and that is of relevance to the research area is that; there appears to be very little knowledge concerning the social systems and characteristics of smallholder organic olive-oil producers in Almería Province. Yet, one study by Parra-Lopez, De-Haro-Giménez, Calatrava-Requena (2007) indicated that in Andalucía most were found in marginal and underprivileged zones, older individuals as potential adopters, typically unc cosmopolitan, little education and more motivated by environmental rather than economic reasons. Additionally they are typically guided by their own practical experience and contact with informal information networks.

3. Research Methods

3.1 Introduction

As stated in the previous chapter, in order to achieve Objectives 1 and 2 a literature review had to be conducted. In order to achieve the specific research objectives 3 and 4 primary data will need to be collected.

Objectives;

3. *Explore smallholder olive-oil producer's views and practices related to sustainable/ systems, including drivers and barriers.*
4. *Formulate recommendations to help foster greater sustainable olive-oil production uptake in favour of intensive production methods.*

A conclusion at the end of the literature review appears to be a lack of individual farmer's perspectives on sustainable farming in Almería Province. Additionally, there seems to be a lack of case studies on contemporary sustainable businesses, which would be useful for a host of interdisciplinary academics such as business, and tourism. Therefore by identifying a gap in the existing research it is purposed that research into this area should be conducted. This will give a geographically specific case study to help substantiate the knowledge on smallholder organic olive-oil farmers and support appropriate recommendations to help ensure their survival. This will require personal perspectives by the farmers themselves therefore interviews appear to be an appropriate research method.

This chapter will start by stating the overall research strategy, then how the data was collected and subsequently analysed, finally highlighting limitations and problems with the practical research itself.

3.2 Research Strategy

As with any research it is important to have sound philosophical views on how the data will be collected and on what principles they are based on. The overall research strategy that was adopted in this research adopts a humanistic approach. Humanism is "broadly 'interpretivist' in the sense that it is concerned with how the social world is interpreted, understood, experienced or produced" (Mason, 1996). This research strategy was accepted as a suitable philosophy based on objective 3 - *Explore smallholder olive-oil producer's views* – and therefore the data collection method of semi-structured interviews is engaged.

A quantitative method, by developing a hypotheses to explain, predict and model human spatial behaviour and decision making, broadly speaking positivism (Johnson, 2003 as cited in Clifford, French & Valentine, 2010), was explored prior to data collection. This method of enquiry has strong attractions for the researcher to prove or disprove their point based on empirical enquiry with strong factual evidence. “The quantitative approach to data collection and analysis involves making deductions and reasoning through mathematical modelling and statistical techniques to understand geographical phenomena” (Clifford, French & Valentine, 2010). However as this project focuses on individual farmers perspectives, in a specific olive-oil producing region (Almería), of a single country (Spain), therefore the more qualitative approach to research was deemed more applicable to this research project.

As a result the interpretivist method of data analysis is used when analysis the farmer’s perspectives, i.e.; listening to what the olive-oil farmers have to say and interpreting their responses to get a personal and experienced account. Interpretivism has to be framed in the realities of the present time and context (Mertens, 1998 p.) In this specific research area the time, or zeitgeist, and context is clear; Spain, along with the rest of Europe and throughout most of the world, is on the recovery road from a severe economic recession. As a result, there is a fluctuating price of oil, higher levels of unemployment, and so on. In addition to this, there is competition from olive-oil producers new and old who can pay their employees lower prices and grow intensively thus market their products at a lower price. These points have been laboured through academic discussion in the literature review; however it is important to incorporate such contextual information in the interpretation and analysis of the primary data collected.

3.2.1 Grounded Theory

Grounded theory is primarily enquiry through the relationship between the Literature Review and the practical research in a symbiotic way where one feeds into another (Biggman, 2011). There is no set structure in terms of objectives and overall aim, the researcher has a level of independent academic freedom to continue to enquire, refer back to the literature then repeat until substantial relevant discoveries are made (Glaser & Strauss, 1967 as cited in Biggman, 2011). Although this research project has a clearly defined research focus; with an overall aim and supporting objectives; a literature review that provides material for primary data collected; and a subsequent conclusion, there is still the element of the uncertainty concerning what the primary data will reveal.

Uncertainty in the sense that, the primary research is very exploratory in nature, and the interviews may reveal issues not previously envisaged. Therefore although this research project is not explicitly employing the Grounded Theory research method, in practice it does exude some similarity, notably the lack of hypothesis, so consequently it is worth noting.

3.3 Data Collection

Data collection was conducted by undertaking the following two tasks:

1. A case study of the smallholder organic olive-oil producer; Oro del Desierto was used to produce a descriptive example of sustainable agricultural best practices used in Almería.
2. Personal interviews with smallholder farmers in Almería Province.

Therefore two research methods were adopted and are of relevance to the research strategy, firstly the case study, and secondly the interviews.

3.3.1 Pilot Study

Prior to conducting interviews with smallholder farmers an informal pilot study was conducted with a Spanish speaking resident of Sorbas, Almería Province, who was fluent in Spanish, and native to English. This study revealed that some words in English did not mean the same as they did in Spanish. For example 'farm' in English concerns arable and pastoral, however in Spanish it only concerns with pastoral or animal farming. Subsequently the word 'farm' – In Spanish: 'granja' – was replaced with the Spanish words for olive-oil farm: Aceite de oliva de la finca. This may seem like a minor point; however it proved to be of vital importance when giving specific and concise questions which could be understood clearly by the olive-oil farmers.

3.3.2 Oro del Desierto

The case study of Oro del Desierto had been selected because, in addition to the farms best practices, it is one of only two organic olive mills in the Province. Subsequently some of the company's clients, who used the olive-oil mill facility, were interviewed. The case study is descriptive in nature as the primary function is to gain an understanding of the organisation's production practices, not to explain or explore in detail as this not seeking to answer cause and effect questions (Biggman, 2011).

The producer was selected as a best practice case study after a reconnaissance of the research area, prior to the data collection, revealed that this was the oldest of only two EU certified organic mills in the Province. This mill, opposed to the other alternative, was selected purely on the basis of the convenience; the owner was accommodating and helpful, so much as he provided a full tour of the estate at harvest time, October 2012.

The farm manager of Oro del Desierto, Rafael Alonso Aguilera, was instrumental in providing the contact details of the organic olive-oil farmers used in this research; without this personal communication, it would have been very difficult to contact these remote farmers, therefore an appropriately note-worthy example and justification of the humanistic research philosophy.

3.3.3 Smallholder Interviews

In total there were 6 interviews, at different locations in Almería Province (see appendix 3) including the interviews with the Province's only two organically certified mills. The interviews are semi-structured and acted as a driver to open up the opportunity to, with the aid of the literature review, advance the understanding of the dynamics behind sustainable smallholder organic olive-oil production in Almería Province. A set of focused questions was needed prior to the interview process to help steer discussion (see appendix 1), however the farmer was encouraged to speak openly and was only prompted these questions as required. This method of data collection was used as structured questions makes use of open-ended questions and encourages meaningful responses (Patton, 1990, Denzin & Lincoln, 1994). Furthermore, associated leads, depending on individual responses, were also generated. For example the location, and contact details of the only other organic olive-oil mill in the Almería Province came from one interview, which then led to a valuable interview. This subsequently opened up new issues which were previously unthought-of; such as the importance of organic olive-oil mills for smallholder survival in the area.

As there is a language difference between the participants and the researcher, steps were taken to compensate for this inconvenience in two ways; firstly, wherever possible a translator was present, this gave a great opportunity to probe and question olive-oil farmers further and continue discussions.

Secondly, the questions were presented in Spanish and the participant was told to speak fully and at length as the interview would be recorded, translated, and then transcribed at a later date. The participant was assured that their personal details would remain confidential, and that they had the right to withdraw their information at any time. Contact details were exchanged so that the participant could have a Spanish language copy of the research upon completion. After interviewing the farm managers/owners a discussion of the responses undertaken to understand similarities, differences and emerging issues (see chapter 5 - Empirical Research Findings: Description, Analysis, and Synthesis).

3.3.4 Recording Interviews and Multimedia Technology

The question of how to record the interviews is one that has required some thought. Initially the researcher proposed to write down responses as the interviews were being conducted; however this would break down the flow of responses and may lead to omissions, and subsequently make the participant feel disengaged. Consequently, a time consuming translation and transcription will need to be conducted; however given the circumstances of language barriers and availability of research participants, this caution will guarantee higher levels of knowledge than memory or notes alone.

All interviews were recorded digitally using an iPhone 5 and the questions were presented to the interviewee via iPad 3. These two digital devices were selected as the iCloud facility, available on apple products using an iTunes log in, gives the researcher the ability to automatically back up their information via internet, store it on a personal website, and retrieve it later. This was adopted due to in consideration of this report's risk assessment which highlighted loss of equipment as a potential risk (see appendix Risk Assessment). If the interview recordings were lost, deleted, or stolen, the content would have been irretrievable.

The researcher took notes, however due to the language barrier this was not always possible and accurate. Furthermore the iPad 3 was used as the researcher could edit questions if need be, take high quality photographs, and also record the position of the interview via electronic map.

3.4 Framework for Data Analysis

The interview data, case study of Oro del Desierto, and the literature review are compared and contrasted to help achieve the overall aim of this project; 'provide useful information of the dynamics behind sustainable smallholder organic olive oil production in Almería Province, Spain to help ensure their survival'. Also, by comparing and contrasting the data at a number of levels, a richer dimension of analysis can be accomplished. This will enable objective 4 to have greater reliability and therefore more useful.

A qualitative data analysis diagram is provided as a provisional visual aid for the analysis process by Biggman (2011) and is included in this section to illustrate the interactive nature of the various data available:

Source: Author's own replication based on Biggman's Qualitative data analysis process (Biggman, 2011, p 164)

In order to help make the interviews more focused, and to maintain attempts to achieve the main objectives of this project; the described data is grouped into themes. These themes are outlined by analysing the key issues drawn from the literature review conclusion subsection in the methods chapter, Oro del Desierto case study, and the interviews themselves.

A framework for analysis and synthesis is based on themes listed below:

Drivers; for sustainable organic olive-oil production

Barriers; in achieving sustainable organic olive-oil production

Motivations; for and against sustainable/ or organic practices.

Reflections and future directions; on how subsequent EU subsidies should be provided

It should be noted that these themes are not separate topics but merely an aid for analysis. In terms of synthesis of the described data, themes and issues, Wolcott (1994) suggests a process of *description, analysis and interpretation*. Therefore the resulting deductions and consequent recommendations will be based on a thorough all-inclusive researched based on a blend of primary and secondary sources.

3.5 Limitations and Potential Problems

A clear limitation to this study is the fact that the primary data collection came with a language barrier. Although, where possible, steps were taken to mitigate this problem, the researcher could have had more in-depth discussions with a greater number of olive-oil farmers, subsequently only 6 farmers offered acceptable interviews, which is an issue in itself. Only 6 interviews were conducted due to the remoteness of the research area, language difficulties and inaccessibility issues. The interviews themselves provided little in the way of quantitative data however they provide a detailed picture of the experiences and perceptions of individual smallholder organic olive-oil farmers working within a micro level; Almería Province.

A final note on the language barrier limitation came when an informal translator was used. During two interviews there was a person who could speak English and Spanish, this translator was not employed by the researcher but happened to be present at the time of the interview. One drawback of using a translator that is not qualified for the position, or one who has not got applicable experiences is that they sometimes choose what they feel is pertinent and what is not. For example this interview transcript:

L: As many as he wants, you should have told me, I would have told my wife, she speaks English. IF I would have known they could've spoken in English, it is easier. IF you have any more questions, you can ask me in the afternoon.

G: He says if you've got more questions in the afternoon you can come back and ask.

H: really? Oh that's really nice.

The interviewee 'L' stated that his wife speaks English, if the translator 'G' had mentioned this, a follow up interview would have been suggested, and could have potentially resulted in even more useful data.

Due to the locational specifics (Almería) and similarities that exist in smallholder olive-oil cultivation methods, it was deemed necessary to produce a case study of best practice examples of one smallholder olive-oil farmer in the Province. However, as this is just a single farm, in one specific region of Spain and Europe, the resulting case study cannot be generalised, therefore its usefulness may not apply to a broad range of geographical locations. Yet, a reliable picture of how a sustainable organic olive-oil and an effective milling service is operates has emerged which can be useful for a host of interdisciplinary academics such as business, and tourism.

4. Case Study: Oro del Desierto and Organic Olive-Oil

4.1 Introduction

This chapter provides the report a case study exemplar of best practice sustainable smallholder organic olive-oil production. The case study centres on Oro del Desierto, producers of extra-virgin organic olive-oil, in the desert of Tabernas, Almería Province. In addition, the chapter summarises topical information which is pertinent and critical to the value and logic of the research in this study, including defining what constitutes as a sustainable olive-oil production system, smallholder farm sizes, and organic certification. This has been done in order to clear up any pre-misconceptions and/or uncertainties regarding sustainable organic olive-oil production.

4.2 Principles of olive-oil production

According to Gómez-Limón, Picazo-Tade, Reig-Martínez, (2012) regional olive-growing systems can be grouped in one of the three predominant occurring types; traditional rain-fed mountain groves, traditional rain-fed plain groves, and irrigated intensive groves. These are categorised on the basis of three variables;

- 1) The slope of the land; moderate slope (plain) or high slope (mountainous)
- 2) The availability of irrigated water; rain-fed versus irrigated
- 3) The density of olive trees; less than 140 trees per hectare (traditional) versus more than 140 trees per hectare (intensive)

Variables one and two relate to nature; the natural resources necessary for agriculture; water and soil, whereas the third identifies the production strategy followed by olive growers (Gómez-Limón, Picazo-Tade, Reig-Martínez, 2012). There are many olive farming types, including those who practice mixed production, for example some mountainous areas that are irrigated and intensive. However due to their larger land cover, there are three common olive farming types;

- A. Traditional mountain groves – high slope, rain-fed, low density of trees per hectare (see plate 1)
- B. Irrigated intensive groves, - moderate slope (plains), irrigated, high density of trees per hectare (see plate 2)
- C. Traditional plain groves – moderate slope and rain-fed, low density of trees per hectare (see plate 3)



Plate 1 Traditional mountain groves, near Níjar village, Almería Province (Source: Author's own photograph)

At Andalusia olive growing level, the region Almería is situated in, olive farm types A and C cover approximately 880,930 ha (64.85%) whereas C type olive farming covers 226,184 (16.6%) (Gómez-Limón, Picazo-Tade, Reig-Martínez, 2012). Therefore we can see that although traditional olive groves dominate the landscape, intensive production still accounts for a large area. Research suggests that intensive olive farming is on the increase, and with that so does increased competition for land, water, and another producer to increase supply (Duarte, Jones & Fleskens, 2008).

4.2.1 Unsustainable olive oil production: “The good, the bad and, the ugly!”

When using the term ‘best practice’ this report refers to olive-oil production that is conducted in a sustainable manner. Because the words ecological, eco-friendly, and organic, can conjure up the impression that the product (olive-oil) is grown in a sustainable manner, attempts should be made to dismiss this assumption. As production is spread throughout developed and developing nations, different production systems are present, even within a single a few kilometres of one another therefore we can begin to see how production is not homogeneous. Also just because a producer is organic it does not mean that the olive-oil farm is sustainable. Consequently, it is necessary to determine what constitutes as a sustainable olive-oil production system and what falls short.

Nevertheless, let us follow the discourse of what is very probably not a sustainable production system; a system that depends upon the use of chemical pesticides, fungicides, insecticides, and artificial fertilisers, which often solve one problem but creates another. For example liquid nitrogen fertiliser are used to help encourage a high growth rate in olive trees, which consequently degrades the soil fertility leaving it seriously degraded, and further increases the demand for water (De Graaff & Eppink, 1999, Smith, McTaggart, & Tsuruta, 1997). The soil is degraded after a few short years which in turn increases the demand for nitrogen fertiliser and with it so does the demand for water. In a province such as Almería, a semi-arid environment, one of Europe's driest regions, (Lazaro, et al, 2001) one cannot help but clearly see that this is not fit for purpose.

Research tells us only too well of the damage to ecosystem services the use of pesticides, fungicides, and insecticides, inflict (Beaufoy, 1998, Hampicke, 1978). Not only do they kill the species of plant and insects that are invasive and detrimental to the olive tree, they eradicate the funguses that are non-harmful, the pollinators, and migratory species of bird which are responsible for the health and wellbeing of ecosystem (Guzman Alvarez, 1999). In the words of one smallholder olive-oil farmer: *"if you treat with pesticides, you are killing the good, the bad and the ugly"*. However, in the short term producers can make good economic returns, higher production rates, and the subsequent €3 per kilogramme subsidy on top of the sale price, is an attractive option in a time of economic difficulties such as now. This being said, the producers at Oro del Desierto insist that farming in a sustainable manner is even more profitable in the long term, favouring high quality over quantity. In summary, intensive olive-oil production is a



Plate 2 Irrigated intensive olive groves, Tabernas desert, Almería Province (Source: Author's own photograph)

system that typically excludes nature from the growing process as much as possible; trees grown with the use of artificial fertiliser, unnatural grown then occurs which requires a lot more water. In addition, thanks to the use of chemical pesticides and herbicides there is low to no levels biodiversity (see plate 2). Let us examine what constitutes as a sustainable olive-oil production system with the case study of Oro del Desierto.

4.2.2 Sustainable olive-oil production: case study Oro del Desierto

Oro del Desierto are producers of extra virgin organic olive-oil, in the Tabernas desert in Almería Province (see map on appendix 3). This family owned and managed business operates independently of any shareholders, therefore the income generated from olive-oil sales is spent on operational costs and profits stay with the company. The company meets 100% of its power needs from solar generated electricity and biofuels from waste of olives (Oro del Desierto, 2013). Energy self-sufficiency allows the company to make a serious contribution to creating a sustainable future, due to not increasing energy demands on the national energy infrastructure. Although the production is not as high as local intensively producing growers, the quality of the organic product creates a unique selling point in itself.

Classification

The growing system is traditional rain-fed moderate slope (plains) groves with low density of trees per hectare. This means that there are less than 140 trees per ha, and the topography of the land is typically flat. Rainwater is harvested and a drip feed irrigation system is used. Plate 3 is a photograph of an area of the estate, note the presence of vegetation at the base of the trees compared to the intensive production shown in plate 1.



Plate 3 Traditional plain groves at Oro del Desierto (Source: Author's own photograph)

Closed loop production

The closed-loop production system Oro del Desierto employs enables the company to produce olive-oil as a virtuous circle; Solar photovoltaic panels generate electricity to power the pumps which irrigates the land (see figure 4, plate A), similarly the roof of the mill itself houses solar photovoltaic panels. Rainwater is collected and stored in a purpose built reservoir (see figure 4, plate B), which is a common practice in the region, so too is the drip feed irrigation system which minimises water wastage, Oro del Desierto then bury the pipe work to avoid evaporation (see figure 4, plate C).



Plate A. Solar Photovoltaic Panels



Plate B. Purpose build reservoir



Plate C. Drip feed irrigation before burial



Plate D. Museum and Restaurant

Figure 3 Oro del Desierto estate (source: Author's own photographs)

The waste olive husk from the milling process is used as natural fertiliser and animal feed. Ghosts are then used to control ground vegetation such as grasses. Also a hen species was chosen that are Andalusian that feeds on the seeds of emergent vegetation. Therefore, this method of ecosystem management is environmentally friendly.

Income Diversification

Primarily Oro del Desierto are concerned with the production of high-quality organic extra virgin olive-oil. However they diversify their income in a number of ways;

Firstly the Museum Restaurant (see figure 3 plate D) - *Los Albardinales Restaurante Almazara Museo* - is located in a restored oil mill from 1925. This museum shows the evolution of olive-oil production through restored artefacts and the restaurant is where customers can taste local dishes in which their olive oil is the prime attraction. Also the museum restaurant acts as a selling point of bottled olive oil.

Secondly an olive mill service – Oro del Desierto offer an olive mill service which gives the customer the ability to mill organically thus gaining certification. This service comes at a charge to the customer, but the grower has the option of selling their produce which can generate an instant financial return for the farmer.

Finally accommodation – Eco-friendly accommodation is available for tourists.

Socio-cultural sustainability

It is accepted that agriculture should be socially and culturally relevant in order to be truly sustainable. Oro-del Desierto adopt this philosophy ensuring food security, in this case olive-oil, is achieved chemical free, and of good quality. Equitable income distribution is incorporated into the employment structure; they employ 12 people (including family members, 5) and then 7 workers, then 20 to 30 for harvest over October and November, As working conditions are good, bonus for picking rates apply, and a fair wage is paid the Farm Manager Rafael insisted that; *“when they sell the oil they don’t say the oil from my company, from my boss, they say our oil, which means they are involved”*.

Additionally the company's contribution to the viability of rural community is long established;

"As a family company they are not just workers, they are like a family, they work with us 12 years 15 years sometimes, so it's kind of like a family. All these fixed workers are from the village, we need to employ the people who are here. The people I employ for the harvest we offer the work to everyone... some from the village [Tabernas], others are international, Romans for example"

Obviously companies can only employ a certain number of people per year, yet by employing local residence and migrant workers the company is helping to both link the financial profits of the company in the local area, acting as a multiplier effect, and encourage migration which brings more economically active members of the population into the Spanish economy. It is worth mentioning that due to the recent high rates of unemployment in Spain, Spanish workers who would typically seek employment elsewhere are returning to the agricultural sector, this was noted in the interview with both Oro del Desierto and other smallholder farmers in the province.

4.2.3 Organic production

Organic production is based on the following principles:

- Use of the natural resources, living organisms and mechanical production.
- Both the development of crops and how livestock production not be seen independently to the ground.

Organic olive-oil production was known as conventional for thousands of years as the tree was planted and maintained in a manner which mirrored nature's systems yet somehow this system is now the alternative production method. The principles listed above were articulated by Rafael during the Interview and are summarised as follows;

Great pains are taken to preserve the soil fertility by using organic matter to build and maintain its quality and effectiveness; tree growth rate and yield production is set within the limits of the ecosystem that supports it; high levels of biodiversity are present such as; pollinators, birds, wildflowers, herbs and so on act that as an ecosystem service, as they control disease and increase the quality of the soil and subsequent product; there is not a monoculture of a single variety olive tree, therefore if disease or pestilence does strike the implications are not catastrophic.

Olive-oil producers obtain an CAAE logo (see figure 4) when their produce is certified as organic; however meeting the standards required for organic certification involves a great level of attention to detail, from the type of fertiliser used to the mill in which the olives are pressed. The guide by the CAAE is very helpful in describing and explaining the entire organic certificate system and discusses fully and at length the intricacies of organic production (see appendix 4). This service is offered at a cost to the farmer as the CAAE is a private company operating using the criteria set Organic production under European standard ETS 834/2007, therefore the service provides the producer with the EU logo (see figure 4 and note the green EU organic production leaf).

4.2.4 Subsidies

Although there are many EU Subsidies farmers can take advantage of, there are two distinct types available to Almerían olive-oil growers;

Single Farm Payment – smallholder (>0.3 ha) olive producers receive a flat payment calculated on the basis of their production. The production-linked payments are intended to provide a stable income support (EC, 2011). The current single farm payment rate is €3 per kilogramme (personal communication with Rafael Alonso Aguilera, Farm Manager, Oro del Desierto, 15 June, 2013).

Olive Grove Payment - larger farms (<0.3 ha) maximum of 40% of the subsidy remains linked to olive oil production, but is intended to ensure that olive farming is socially and environmentally sustainable (EC, 2011).

5. Empirical Research Findings: Description, Analysis and Synthesis

5.1 Introduction

This chapter analyses the results of the interviews described in the Research Methods Chapter. The analysis is synthesised with the findings from the literature review, in order to create an analytically thought-out, reasoned, and argued discussion. This will complement objective 3, and in addition, with the successful completion of objectives 1 and 2, provide a reliable basis on which to conduct objective 4.

The intended approach to the data analysis, as fully described in Chapter 3 - Research Methods - is to; describe the collected data (interviews), group this description into themes and issues, such as; EU subsidies, whilst synthesising where applicable the case study of Oro del Desierto.

The Transcripts of the smallholder olive-oil farmer Interviews, including Oro del Desierto, can be found in the appendices (see appendix 2).

5.2. Discussion

Before getting to the nub of the discussion, it is appropriate to indicate the motivations behind sustainable productions, as expressed by the participants. One farmer expressed a deep reverence for the natural world;

“The countryside is peaceful and in harmony, it’s glorious, that is; well beside all that, it is something very important that the people don’t want to admit, or that we have lost our bearings on how things work properly”

This farmer is saying a lot here in just a few words. In the opinion of the author, the farmer highlights the disconnection between the vast majority of people, who typically live in urban areas in the developed world, and food production and nature. By stating that countryside [nature] works in harmony, one cannot help but acknowledge the fact that we are a part of nature and not apart from it. In other words, we are nature; therefore we must live in harmony, including the way we produce our food.

When speaking to a farmer near Laujar de Anderax, he attributed his motivation to grow organically in these words;

“well, when I started doing organic farming, it was because intensive farming was used a lot and it came out that it ruins your health, that’s where the idea of doing organic farming came from. After many years we realized that the chemicals don’t do anything more than damage our health. So that was the motive of doing organic farming. We are responsible for our own actions, right? And we want the world to respect us, at least as farmers.”

This motive is very different from the environmentally conscious farmer beforehand; it speaks to issues surrounding health, socio-cultural aspects of class and status, along with introducing some of the perceived disadvantages of intensive farming. Of course these opinions are just that; opinions. Believing in someone, or something, when there is no compelling evidence is a mistake, therefore in the remainder of this discussion attempts to substantiate farmer’s perspectives will be made by referencing the literature review. The farmer’s perspectives are there to provide real life accounts of what is happening at a micro level, within this specific industry at a certain place and time. After all farmers know are the practitioners.

One farmer helps to bring this discussion back to the main theme of this research, sustainability, and introduces an important resource and commodity in Almería, water:

“Resource scarcity is a problem for all of human kind, Earth in general. Resources, water is really important, it is the key. If there is no water, then there is nothing”

Also;

“Well the problem is that now water resources, well the water is being used uselessly in doing worthless things, such as bottling it and things like that. There is a lot of waste in those larger farms; they water all day and into the night, every day!”

It is not the purpose of this discussion to only labour the points of environmental challenges; it is to help develop a deeper understanding of the dynamics behind sustainable olive-oil production in Almería province. Of course this industry does not exist on its own, as discussed in the introduction chapter and throughout the literature review, olive-oil production sits firmly in the wider context of food production and agriculture, along with environmental impacts, a myriad of socio-cultural, political and economic connections exist. However it is of great significant to highlight that Almería province is an area of water scarcity, where agriculture, which is reliant on this resource, is the backbone of the economy.

A final motivation worth mentioning is one which will continue to be a present theme within this discussion; the need for olive-oil production to be profitable;

“At the end of the day this is a company, if we want to live from it [olive-oil production], it must be profitable, that’s the main thing”

This comment, as simple and straight forward as it is, speaks volumes to the reality that economics is the driving force behind EU interventions, it is the reason why the farmers receive subsidies to remain in business, it is, amongst other personal reasons, why farmers continue to farm; to produce a product and sell it for financial profit.

5.2.1 The intensive vs. traditional & organic debate

The debate on whether intensive olive-oil production is ‘better’ than organic, and vice versa, depends on what the definition of ‘better’ in the eyes of that specific farmer. One farmer may see intensive olive-oil production as better because it produces higher yields; he then receives an increase in subsidy income, along with more of his produce reaching market, and therefore makes larger financial returns. Yet at the same time a different farmer can have the view point that; if my produce is organic, I have lower financial outgoings for fertiliser etc... and in addition can market my product as organic, therefore a premium high quality product, and sell at a higher price with lower operational costs.

This specific debate in this discussion begins with two contrasting views from the only two organically certified organic olive-oil mills in the province; Oro del Desierto & Almazara de Lubrin. It must be recognised that this is not a comparison of each individual producer's products, and it is not the desire or intent to favour one company over the other, the discussion merely illustrates both sides of the argument from the perspective of to successfully operating business in the Almería province. The General Manager of Almazara de Lubrin states:

"it [intensive olive-oil production] is catching on in Almería, many olive trees, super intensive. With that method they seek maximum profitability. Low economic cost. They mean to produce 2-3 years from when they planted the. You are supposed to get a return back after the third year. So that is what is being used now for, to make money and to recuperate costs, for this you have to mechanise it all"

Furthermore;

"If a tree in conventional [intensive] conditions produces 50kilos [kilograms], an organic on might make only 30 kilos. This is the difference between organic and non-organic. It is very reduced, according to people; some say that organic gets to a point where it isn't profitable. But why go organic? Well you might not have that much water or the necessary means to produce it. What do they do? They make it organic, what can happen? One year it produces olives, the other one, doesn't"

According to this farmer intensive production can result in higher yields, and thus an increase in profits. 20 kilograms extra, per tree, per Ha can result in a substantially greater volume of olive-oil produced; In addition to the increase in production this farmer raises a limitation in organic production when referring to the fluctuating annual yields, a farmer near Sorbas second this claim with his younger trees that he had planted;

"They subsidies you according per kilo of olives. During the last five years I produced at half capacity"

Given that intensive production is 'better' in the sense of higher yields; when the accumulation of this extra quantity, the effect can have financial benefits for the whole commercial chain. For example, an increase in olive-oil production leads to increasing demands for milling (which is offered as a service to those without the means), distribution, and consumption is an economic stimulus in its own right.

In other words a multiplier effect can occur as a result; job creation, taxation, sales revenue all play their part in the economic value of one product. However this increase in production, and the subsequent “*recuperation of costs*” and economic stimulus, must not be blindly accepted as ‘better’ just because it is making a financial profit. Oro del Desierto encourages us to consider the long term realities of intensive production;

“The reality is that we don’t feel that it is less active or less profitable than normal [intensive], it’s even more. Many farmers just look into the productivity of things in the short time. But if you have an open mind and you look at the long term, later, fertiliser for example; normal fertiliser is liquid chemical, water with fertiliser. It’s faster, the trees grow quickly but if you look at 10 years after and you look into the soil, erosion and a salty soil, because you’re using a salty chemical. You then look at organically grown, compost and organic fertiliser in the tree, if you look just at the fertiliser. In 10 years; with less input you obtain more production. After 10 or 20 years, the price of artificial fertiliser’s costs more, it’s going up and up and up, and you have problems with your soil, you need to use more in your soil because it’s so poor, so eroded and it’s salted and you need much more water and much more fertiliser. And then so you look at the long term you find that sustainable farming is better, not only for the environment but for the producer”

Therefore with this perspective in mind; avoiding short-sightedness and building soil fertility organically, is perceived as a ‘better’ mode of olive-oil production. Research concerning the long term impacts of soil fertility shows that as intensification continues, more inputs are needed to maintain the soils suitability and prevent erosion (De Graaff & Eppink, 1999). However, this is the case why then do all farmers not adopt organic fertiliser and organic farming. One farmer suggests that “*I think organic is more difficult to employ. It’s easier with non-organic. I think that’s the reason non-organic is more common*”. If this is so, that organic production is more difficult to employ, then it prompts the question; why continue to farm organically if it is more difficult. The following comment sums up one farmer’s perspective on the outcome of organic production;

“The results, quality is amazing, it is something beyond”

The proverb 'reap what you sow' applies directly to farming, and in this instant the end result, what is reaped, as perceived by the farmers who farm organically is high in quality. But do the farmers truly reap what they sow? The typical view held by the smallholder organic olive-oil farmer is that they do not:

"They pay practically nothing, the guy who buys it off you. And then they trade it and sell it in England or they sell it somewhere else. They sell it at the price they want to sell it, that cannot be; they should have some prices so that the one who produces it can live honestly"

Such a focus on the unprofitability of olive-oil farming, at a farmer to manufacturer level, highlights the issue that some farmers cannot live of their production alone;

"They have to live from something else, and they don't leave the land because they inherited it from their parents, and they have 100 olive trees and they look after them on the weekend and with the family they pick up stuff"

Another farmer stated that;

"Man I say that as a farmer, I have been one all my life. The farmer who only thinks of farming for the sake of farming, you can't live off farming. The farmer has to be an entrepreneur, like any entrepreneur that has to set up his company. Another way of having it and getting a profit in whatever you do. Being a farmer for the sake of farming, no. The product, you have to transform it into something"

Income diversification is not a novel concept for farmers, however this depiction paints a different picture from mere income generating innovations; this instead implies that smallholder farmers have to seek alternative employment in order to live. This brings up another thing that is quite curious; are smallholder farmers producing olive-oil out of a financial necessity or are there other motives? Of course each individual farmer has a unique situation, two farmers inform us;

"I do the work as a type of entertainment, but for a proper farmer, life is very hard. It is very hard to be a farmer; and also, farmers are assumed to be low class, I hope that changes one day"

Also;

"I am ex-military and am retired, my father-in-law had this land and I carry it on outside my job, there is no other explanation. It's easy. I do this as a hobby more like it, a hobby"

Therefore we cannot assume that all farmers depend upon farming, and the subsidies that they receive, for survival. This then leads us to the next debate EU subsidies. Should EU subsidies be directed to helping the survival of farmers who do not necessarily depend upon farming for their livelihoods? And in a time where Europe is recovering from a serious financial crisis what justification can there be to give subsidies to such a part time, or hobby farmer. Perhaps a system of custom-made and individually tailored subsidies would be a solution to this somewhat injustice against the 'real' full time farmers. Yet this group of farmers are still producing a high quality product and incur the same economic difficulties as full time or regular farmers. In addition, as they are growing in a sustainable and organic manner they are exuding environmental stewardship, and therefore beneficial for ecosystem services as there is a healthy level of biodiversity.

5.2.2 EU Subsidies

Given that the financial side of olive-oil production is major discussion point for smallholder farmers, it is no wonder that a lot of farmers have strong and often conflicting opinions on the subsidies they receive. Although chapter 4 defines the types of EU subsidies, it is the participant farmers who offer practical and informative insights into realities of EU subsidies. The discussion is as follows;

"The olive-oil [business] is a problem, Spain exports but Italy is 20 years ahead of us in commercialization, sales and all sorts"

This is highlighting the need to consider European competitors and encourages us not to look at olive-oil production as a localised industry.

"The world market is what is hurting us, big companies, of course they hurt us, and we are all vulnerable"

"with the competition coming from countries such as the ones in North Africa, Morocco, Tunisia for example. With that competition farming has suffered a lot, it is not profitable as their prices are really low. The competition coming from Morocco and the Maghreb [North West Africa, west of Egypt] are very competitive, labour is very cheap. Then they lower the prices for us Spanish, well that hurts us, you have to focus on quality rather than quantity to get the best prices"

It may be the case that even with the most elaborately thought through EU subsidies in place, olive-oil producers outside of the EU will still have a competitive edge over EU producers by having lower wage structures; *“in Europe we pay the workers €60 per day and outside they may pay €10, so we cannot compete”*, The EU cannot simply enforce trade embargos or higher import taxation on non EU produced olive-oil as such practices go against the World Trade Organisation’s regulations and could lead to higher export charges for EU produced goods entering the effected countries. Perhaps a more subtle approach to dealing with competition lies in promoting EU quality? Yet for the moment the subsidies are needed to maintain production. One farmer echoed this need in stating *“There is a lot of people that without this intervention in Europe they wouldn’t be able to continue their cultivation... because of the competition”*. The participant farmers revealed that *“it isn’t much, it really if there hadn’t been a subsidy...we could not be profitable”*. It was also revealed that the subsidies used to be €1.70/1.80 and is now €3 per kg yet this was not profitable;

“€3, yes, I mean that is the justification of the subsidies, in order to be able to produce a highly specialized crop... the prices of the product are really low, you need money to do the job”

This then brings the discussion firmly back into the issue of the price. The subsidies for a reason and the general consensus of the farmers is that they are necessary however they would much rather see the product price higher;

“I don’t like them [EU Subsidies]. Now it’s necessary but I don’t like them, I prefer that the business was profitable. I don’t like the idea of being helped.”

Linking the idea of not being helped, with another farmer’s comment regarding *“farmers are assumed to be low class, I hope that changes one day”*, the subsidies themselves do little change the perceived lower class status of farmers. In a time of austerity and high unemployment, especially in Spain, seeing one income safeguarded over another may cause disgruntled feelings towards the farming community. If this assumption is true, perhaps in changing the entitlement structure of subsidies to favour those who positively contribute to the environment may help to dispel this view point.

However a more urgent requirement of farmers is undoubtedly the need for higher price of olive-oil;

“My opinion is that if the products have a fair price, that they are profitable with the work being one, then you wouldn’t need the subsidy”

This may be true, and certainly would diminish the need for subsidies, however little can be done on a global scale to raise the price of olive-oil when there are so many competitors. Olive producing nations far extend the basin of the Mediterranean, India, Argentina, parts of the United States and Mexico, all influence supply and demand. A fundamental weakness of subsidies is eloquently narrated by one farmer who says;

“They are a short term solution, right now I am helping you by giving you money, but I am not solving the problem”

This being said, the way an entrepreneurial farmer might increase the price of his olive-oil, such as in the case of Oro del Desierto, may be to have an effective marketing strategy to target niche customers who are attracted to a both a product that is of high quality and an interesting narrative. The basics of business economics is clearly an issue here, should something that is not profitable, for whatever reason, be supported? Or is it being supported in the wrong way? A clear critique of the subsidies was voiced in the previous comment; the general consensus of the farmers appears to be that the subsidies offer “help” however little else is provided. A final and very pertinent issue raised by farmers themselves centres around who should be the beneficiaries of EU subsidies?

“Money should be given to farmers who grow ecological. You shouldn’t give it to sell products. Not to give it for the sake of giving it....Money should be given with a common guarantee right?”

This “common guarantee” could be reflected by promoting environmental stewardship;

“use the criteria of sustainability to give them the money, not because of traditional rights.

Whilst another keeps within the environmental stewardship criteria but also ties in hours spent on the farm, and expertise acquired;

“the dude who looks after the farm and the dude who produces and that knows how it really works, that man needs it”

Where other states the subsidies should go to organic farmers because the cost of labour is higher;

“The subsidies in my opinion should be given to those products that are hard to be profitable, organic is much harder labour hours, costs me more”

Many farmers complained about inherited olive orchards that we not properly maintained, or not profitable;

“these people are given a lot of money to maintain them which isn’t good because it’s producing erosion, because inclines are 40/50%, its absolutely crazy”

“They receive a lot of money, some, are using this money not to improve their production, they by a car or a nice house by the beach”

“it isn’t fair that you receive money to improve your facilities or production. This isn’t all farmers of course but some”

5.3 Summary

In conclusion this chapter was intended to achieve objective 3 - *Explore smallholder olive-oil producer’s views and practices related to sustainable, including drivers and barriers* – intended to give an insight into the minds of the farmers who grow organically; their challenges, successes, how they would like to benefit from any EU subsidies, and also see what they perceive is vital for their survival.

In light of the discussion above the following conclusions can be made;

Motivations for adopting traditional (organic) production were expressed by the need to produce healthy produce; farmers wanted to grow using a system that is environmentally friendly, gains respect and dispels any lower social status linked with farming, by positively contributing to society’s needs. One farmer helps to bring this discussion back to the main theme of this research, sustainability, and the main challenge facing smallholder producers is undoubtedly economics.

The general consensus by smallholder farmers commenting on the intensive vs. traditional/organic debate was clear; although intensive production systems can generate substantially greater economic returns in the short to medium term, the long term implications of this system is that the soil fertility is reduced to the extent that greater inputs (artificial nitrogen fertiliser and water) were necessary to maintain production. This leads to increased production costs in the long term, and is linked with a dependence on a fluctuating price of fossil fuels, diminishing water supplies and a fluctuation in rainfall and average temperatures. In organic, traditional (less than 140 trees per ha), the typical view help by the interviewed farmers was that olive-oil production is not profitable due to the low rate of pay offered by the manufacturers and bottlers, the mark-up price when sold to international markets (in say England) is much higher. It appears to be common practice that smallholder farmers are not entirely economically dependent on growing alone, income diversification was common place and the need to be an entrepreneur was firmly established view.

According to the farmers interviewed, EU subsidies were considered to be a form of “help” rather than the solution to their problems. The subsidies enable organic farming to be profitable, however €3 was considered the lowest financially viable subsidy per kilogramme produced. Farmers saw recognised that the subsidies encouraged intensification and stated that they should be changed in order to promote environmental stewardship by giving greater incentives for sustainably produced olive-oil. Competition from producers outside the EU was seen as a threat because wages are lower, and it was perceived that production quantity can be achieved intensively without the environmental stringencies of the EU. All farmers stated that they would rather the price for their products be fair, and therefore not need the subsidies. The importance of this chapter was to help and achieve objective 3 on the basis of the discussion and the summary provided, we can accept that this report has sufficient information on which to then complete objective 4 – Recommendations – and the overall research aim.

6. Conclusion and Recommendations

6.1 Introduction

The overall aim of this research was to *provide useful information of the dynamics behind sustainable smallholder organic olive-oil production in Almería Province in order to help ensure their survival*. The specific research objectives were;

1. *Identify the forces driving the need for sustainable agricultural practices*
2. *Critically evaluate the merits and shortcomings of traditional vs. intensive olive oil production*
3. *Explore smallholder olive-oil producer's views and practices related to sustainable systems, including drivers and barriers*
4. *Formulate recommendations to help foster greater sustainable olive-oil uptake in favour of intensive production methods*

This chapter will revisit the research objectives above, summarising the findings and provide conclusions based on the enquiry. As the previous chapter – *Empirical Research Findings* - was lengthy it was felt necessary to provide a summary at the end of the chapter, therefore objective 3 will not be covered here in any great depth. Recommendations – objective 4 - based on the research will be offered, in terms of how to progress with the implementation of sustainable olive-oil production. Additionally, a sub-section on self-reflections is included. By adopting this structure the report will ascertain whether the objectives stated have been achieved, and also consider the value of this research. Finally, suggested areas of further research are also offered.

6.2 Research Objectives: Summary of findings and conclusions

The analysis has shown that a traditional olive-oil production system and chiefly an organic one has much more to offer than just produce; as the system practices environmental stewardship such as preserving biodiversity, safeguards rural employment, and maintains traditional cultural identities. In spite of these benefits, the production method is faced with an economic drawback; because of a lower productivity level than intensive systems, and rising international competition, low economic returns presents a huge challenge for growers. With the aid of the EU subsidies the system is only just economically sustainable. However high-quality organic olive oil marketed effectively can exploit niche markets and be more financially viable than intensive production systems.

Objective 1: Investigated how we have reached the viewpoint that business-as-usual must be rejected in favour of more durable options;

Primarily it was intergovernmental bodies such as the UN who were responsible for bringing sustainability into the spotlight. The early works of the former Prime Minister of Norway G.H Brundtland, *Our Common Future* (1987) gave rise to the need for sustainability and a rejection of business-as-usual. The subsequent Agenda 21, Rio Earth Summit 1992, 1997, 2002, and 2012, help to secure this spotlighted position by addressing a broad range of global issues including agriculture. In addition to the UN there have also been examples of the need to develop a sustainable future in general, not just in the agricultural sector, but in all sectors by such independent scholars as Schumacher (1973). It would be easy to find other suitable examples of sustainability driving forces from the plethora of published literature, sustainability conferences, from both business and governmental, however it was not the aim of this objective to produce such a comprehensive list.

The literature identified that the main reasons for the need to adopt sustainable agricultural practices as the following; the need to ensure food security in the long term, as we have a rising global population approaching 9 billion by 2050; the ability to produce and access sufficient food, which will become an even greater challenge if ecosystems and the resources they offer us are not conserved; food wastage, both the amount lost in developing nations due to poor storage and developed world due to consumer waste; an energy sector and its growing demand for biofuel, which then removes arable land from food production; Public health concerns, of malnutrition and poor diets in developed and developing countries; and finally the need to reduce dependence on fossil fuels, which have a fluctuating price and directly impacts on food prices. Economic sustainability appears to be the focal point of policy maker's decisions when implementing subsidies however environmental and social attentions are expressed such as soil quality, water usage, safeguarding rural employment, and cultural identity.

An overall conclusion for objective 1 is that intergovernmental organisation such as the UN and EU are the major forces driving the need for sustainable agricultural practices. Governments realise that the food which sustains us must itself be sustained and therefore exude a vested interest in ensuring food security. There are many issues relating to food production and the need for sustainable agriculture, chiefly the need to ensure food security in the long term. Economic sustainability in the olive-oil industry appears to dominate discussion; however there is recognition environmental and social factors play their part.

Objective 2: It was stated that by including a critical evaluation of traditional vs. intensive olive-oil production this would prevent an ill-informed bias in favour of one option occurring. This being said the main findings appear to suggest the following;

Intensive production has much to offer financially; higher yields are made possible by artificial fertiliser and higher water intake with increased tree planting density (more than 140 trees per ha), the resulting produce then exploits current EU subsidies which pay €3 per Kilogramme of olive-oil produced. However on the environmental side there is the issue of overexploitation of water resources, soil erosion, biodiversity loss, and damage to traditional agricultural landscape.

In contrast, traditional production systems work with the grain of nature, water is used efficiently as the tree does not require more than nature intended, soil fertility is maintained by natural organic fertiliser, and there are high levels of biodiversity. The drawback with this system is that due to low density orchards production rate is low. The system is barely economically viable unless the product is of a high-quality, is organically produced, and is supported by EU subsidies.

6.3 Recommendations

As stated above, the recommendations are provided to achieve objective 4, this then helps with the successful completion of the overall research aim - *provide useful information of the dynamics behind sustainable smallholder organic olive-oil production in Almería Province in order to help ensure their survival* – and therefore will be presented with this aim in mind. In addition to the recommendations specific to the evidence presented in this study; recommendations for future research is also provided.

6.3.1 Farm level

On a farm level organic olive-oil production systems should be adopted rather than intensive production. Growers are advised to lose any short-sightedness when looking at the economic benefits of intensive production, and look into the medium to long term when their food production system will be more environmentally and economically sustainable. This can be achieved by adopting water efficiency in the form of drip feed irrigation, organic matter should be used to build a soils fertility, biodiversity needs to be encouraged so that a balanced ecology can occur which generates an ecosystem service, renewable energies should be used to generate any farm electricity usage such as wind, solar, and anaerobic digestion. By growing organically, and harvesting at the right time (October), growers can ensure that they produce high quality extra virgin olive-oil that in turn generates income based on quality rather than quantity. In addition to the environmental and economic considerations; where possible, by employing a local and knowledgeable work force, the grower can contribute to a multiplier effect and act as a social enterprise initiative by preserving traditional rural employment.

6.3.2 Regional Level

On a regional level, policy makers are encouraged to value the importance of organically certified olive-oil mills. As Almería Province only has two certified mills – Oro del Desierto & Almazara de Lubrin – there must be a recognition that these mills are organic hubs on which smallholder organic olive-oil producers depend upon for their survival. This report is not categorically stating that without these hubs farmers in the province would not farm organically, however on the basis of the discussion with farmers it appears that this would be a likely scenario.

By encourage the existing olive-oil mills to formally act as a hub to provide support for smallholder farmers this would help to foster greater organic olive-oil production. By formulating training and education for farmers who which to farm sustainably, and encouraging those who already do so to improve their knowledge by sharing their knowledge with others, cooperatives of sustainable farmers can then help in strengthen community relations.

Local authorities would need to provide financial support for these farmers to establish this service, and provide an effective marketing strategy to promote Almería Province's organic production and help build a sustainability identity. If the product is marketed effectively, such as in the case of Oro del Desierto and Almazara de Lubrin, smallholder producers would generate greater financial returns as the price of extra virgin organic olive-oil is greater than others. As several farmers suggested, the olive-oil farmer needs to be an entrepreneur and create something more than just the produce. The product itself must be marketed to sell the consumer an interesting narrative which niche customers can buy into and then market in delis, restaurants, and independent stores. Oro del Desierto informs this report that there is a growing market for olive-oil, particularly in Japan and the United States, therefore perhaps marketing this high quality product as a specialised, healthy and traditional Mediterranean product will be the competitive edge and unique selling point needed to gain a market share and boost sales.

6.3.3 Governmental Level

A clear recommendation to be made is the need to give farmers who produce using a sustainable production system greater financial support than the farmers who do not. This report and its findings suggest that organic production should be the preferred olive-oil system, as the financial returns for this type of product are generally higher than non-organic. Therefore on the basis of this suggestion EU policy makers are encouraged to promote organic produce on a wider scale throughout the olive-oil producing regions of Europe. In doing so they will be supporting a system that does not have an umbilical connection with a fluctuating price of oil, a system that does not treat the environment as a mere object to be exploited, and a system that is not entirely set up based on the illusion of profitability thanks to subsidies. The greatest financial support should be given exclusively to farmer who meet a sustainability criteria which mirrors CAP interests, safeguarding rural employment, practicing environmental stewardship and generating social enterprise initiatives such as traditional employment.

On a wider scale, including non-EU nations, the WTO and FAO could introduce a social enterprise initiative to encourage a fair wage for olive-oil workers. Because the product is a specialised crop, and the environmental improvements of growing sustainability (higher biodiversity) directly influence the biosphere, unilateral agreements on standards of wage should be set to acknowledge this important service. This being said, in a time of economic austerity it may be difficult to justify the increase in expenditure in this one sector of the agricultural industry and take precedence over other forms of food production that make up staple diets such as wheat, rice, and maize.

6.3.4 Suggestions for future research

Although this project researched views of traditional smallholder olive-oil producers in Almería Province, it would be of added value to gain an understanding of the intensive production system grower's values and motives. This would help to identify why some people choose to disregard a sustainable approach to food production, when the evidence and prevailing research proves their methods to be short sighted and centered on economic lust.

6.4 Contribution to knowledge

The empirical research work is unique; there appears to be no other researcher that has focused on traditional smallholder olive-oil production exclusively in Almería Province. Larger studies have focused at the regional Andalusian level, and have included interviews with smallholder farmers, however the aspect that is unique to this report is that; as a result of the empirical research, it has been discovered that there are just two organically certified olive-oil mills in Almería Province; Oro del Desierto and Almazara de Lubrin. The farmers that were interviewed openly admitted a dependence on the organically certified olive-oil mills as they could then market and label their produce legally as organic.

This being said, there may be smallholder producers in the province who have their own organic milling facilities but use it on a personal basis, however in the light of the fact that many growers farm on a part time basis, and do not have the facilities of their own, we should accept and recognise the necessity of the service these mills provide. Without these mills many of Almería's farmers may not be able to market their produce as organic, therefore may choose an intensive production system to take advantage of the €3 per kilo EU subsidy and grow for quantity over quality.

Such a discovery may appear to be menial, and may already be known to local authorities and companies such as the CAAE, however there does not appear to be any published academic works highlighting this find concerning Almería Province. What is significant about this discovery is the levels of dependency expressed by individual smallholder mill clients.

6.5 Self-Reflection

If this research was to be conducted again an alteration would be to obtain a greater number of participant farmers to interview. However obtaining such contacts relied upon networking skills on a personal level as many farmers did not profess to have their contact details available online.

For future students researching a similar project, the first piece of advice would be to arrange a specific time to meet the participant, find out exactly how long it would take to travel the distance, and suitable maps are used.

The research offers a personal insight into the minds of the people responsible for our food security, the farmers. They know their land with all its strengths and weaknesses better than any policy maker or researcher, they are the practitioners. The author hopes that their thoughts and opinions have been summarised and conveyed in a manner that reflects the current zeitgeist.

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8. Appendices

Appendix 1. Interview Questions and Informed Consent

Informed Consent;

Hello, I am a student at the University of Chester. I am conducting research on smallholder holder olive oil in the province of Almería. I am particularly interested in your opinion.

I want to know what problems you face as an olive-oil farmer, what your opinions on organic agriculture etc... Would it be okay to interview and record your responses on my phone for my research project at university? Your responses will be translated into English when I return to England, so please feel free to express their views in detail and in full. In addition to this, you have the right to remain anonymous, and replace your name with the location of the olive-oil farm.

Hola, soy un estudiante de la Universidad de Chester. Estoy llevando a cabo la investigación sobre el aceite de oliva titular de los pequeños agricultores en la provincia de Almería. Estoy particularmente interesado en su opinión.

Quiero saber cuáles son los problemas que se enfrenta como un agricultor de aceite de oliva, lo que sus opiniones sobre la agricultura orgánica, etc ... ¿Estaría bien para entrevistar y grabar sus respuestas en mi teléfono para mi trabajo de investigación en la universidad? Sus respuestas serán traducidos al Inglés cuando regrese a Inglaterra, así que por favor no dude en expresar sus puntos de vista en detalle y en su totalidad. Además de esto, usted tiene el derecho de permanecer en el anonimato, y vuelva a colocar su nombre en el lugar del aceite de oliva de la finca.

Below is an example of some of the questions used to prompt responses from farmers interviewed;

1. Can explain briefly why you became an olive-oil farmer and what aspects of agriculture that you like?

Puede explicar brevemente por qué se convirtió en un productor de aceite de oliva y qué aspectos de la agricultura que te gusta?

2. What are your biggest problems / challenges as an olive-oil farmer?

¿Cuáles son sus mayores problemas / desafíos como un agricultor de aceite de oliva?

3. How do you grow your olives organically?

¿Cómo hacer crecer sus aceitunas orgánicamente?

4. How do you increase / maintain the quality of your soil fertility?

¿Cómo se puede aumentar / mantener la calidad de la fertilidad del suelo?

5. Where do you get your water from? Can you tell me how you irrigate your land?

¿De dónde sacas el agua de? ¿Me puede decir cómo regar su tierra?

6. In your opinion, What is the best way to prevent the disease in trees?

En su opinión, ¿Cuál es la mejor manera de prevenir la enfermedad en los árboles?

7. Are you vulnerable to competition from large industrial olive-oil producers?

¿Es usted vulnerable a la competencia de los grandes productores de aceite de oliva industriales?

8. Is the depletion of resources (eg, water, soil quality) a problem to you?

¿El agotamiento de los recursos (por ejemplo, el agua, la calidad del suelo) es un problema para usted?

9. Do you receive European Union, government subsidies for olive-oil production?

¿Recibe la Unión Europea, los subsidios gubernamentales para la producción de aceite de oliva?

10. How would you like olive-oil subsidies to be distributed?

¿Cómo le gustaría subsidios oliva oill a distribuir?

11. Can you sum up your life as an olive-oil farmer, for example: good parts, less favourable, enjoyment, etc...

¿Puede resumir su vida como granjero de aceite de oliva, por ejemplo: partes buenas, menos favorable, disfrute, etc ...

At the end of the Interview this message was presented to the farmer:

Thank you very much for being a participant in this interview. The results of my investigation will be available from October 2013. I can take a contact detail to forward a copy of this to you nearer the time. If you would like to remove your interview from this investigation at a later date please contact me on the email address I have provided and I will remove your interview.

Muchas gracias por ser un participante en esta entrevista. Los resultados de mi investigación estarán disponibles a partir de octubre de 2013. Puedo tomar un detalle de contacto para enviar una copia de esto a usted se acerque la fecha. Si desea eliminar su entrevista de esta investigación en una fecha posterior, por favor póngase en contacto conmigo en la dirección de correo electrónico que he proporcionado y quitaré tu entrevista.

Appendix 2. Interview Transcripts

1. Rafael Alonso Aguilera, Oro del Desierto; Tabernas

H: Interviewer

R: Rafael Alonso Aguilera, General Manager at Oro del Desierto

BEGINNING OF INTERVIEW

R: 1998, family has been into agriculture for 7 generations. This family business has been established for 15 years though. I enjoy my work because, after I work outside of the business, I went to university work outside, now though I am happy to work here, I do what I do because I like it. It is not very common for a person to work so close to the land and enjoy exactly what he does, especially young people in Spain, It's exciting for me.

Enjoys his work because he likes what he does.

H: What does the term sustainability mean to you?

R: I studied environment at university, so we think about the production as a whole. Only producing things and selling them, that's the thing businesses do. My family have been producing produce for many years, almonds etc... and organic agriculture is not such a new thing, it's just what we did for the whole life. Chemical agriculture has come in around 1930s 1940s so it's not such a new thing.

Sustainability, I did not introduce this into my company, I joined the company and my father he had already had lots of concepts, when me and my brother joined we introduced some more of course, but many of the basics were already there. Re-using the waste, producing clean energy, pumping Water from solar energy. Its sustainability but isn't organic farming, that's just sustainable thinking. You can operate organically and not sustainably. It is just free from chemical, not both things. We try to have both things. So sustainability is not such a new thing, I have been thinking it a long time, it was here already, it is something of a way of life.

H: So can you tell me your motivation for farming in the way you have just described? Why did you choose to come back to the farm after university?

R: I decided to join the production with my father because, it is my choice, I wasn't forced. I was working outside, I was not happy with my previous employment, many hours, not very exciting. I worked for two companies. I decided to join my father's business because he needed help, I say "I want to work with you, let's try" see how it goes. Now today, I couldn't imagine doing another thing. I really like my work, sometimes it is hard, difficult,

sometimes I think differently one day, and differently another. But there are more positives than negatives. Relationship with the land and farm, a sense of what is local.

I also work with my grandfather. I see today the olive trees that I planted before. Before we didn't have the pumping we had very dry conditions, very dry almonds. Today, we make it of course sustainable and profitable. 2013 is nothing to do with 30 years ago, there is a totally different market and we need to adapt ourselves to the reality, the everyday realities too. So you can be sustainable, its good, you can be organic, but you need to be productive, and to produce really good quality and something really different, to be profitable. Because at the end of the day this is a company, if we want to live from it, it must be profitable, that's the main thing.

H: yeah, the main thing. You talked about being profitable and using sustainable practices. Is it easier to farm sustainably?

R: Sometimes it's just, stop and think. Take a look at just a short period of time, the trees or whatever you cultivate 1 year 2 year and the profit. Probably organic or sustainable farming, its not so interesting. But if you look into the long term, all the trees today and after they have grown and produced and after everything in the method we have done to make it sustainable. The reality is that we don't feel that it is less active or less profitable than normal, it's even more. Many farmers just look into the productivity of things in the short time. But if you have an open mind and you look at the long term, later, fertiliser for example; normal fertiliser is liquid chemical, water with the fertiliser. Its faster, the trees grow quickly but if you look at 10 years after and you look into the soil, erosion and a salty soil, because you're using a salty chemical. You then look at organically grown, compost and organic fertiliser in the tree, if you look just at the fertiliser. In 10 years; with less input you obtain more production. After 10 or 20 years, the price of artificial fertiliser's costs more, it's going up and up and up, and you have problems with your soil, you need to use more in your soil because it's so poor, so eroded and it's salted and you need much more water and much more fertiliser. And then so you look at the long term you find that sustainable farming is better, not only for the environment but for the producer. If you compare, I cannot compare with others. I can feel the difference, I can see the difference. My trees look better. Sustainability in the long time can be so much better and people need to keep that in mind, of course it's better for the environment too and for us as the grower in the long term.

H: In the short term, what is the competition? The non-sustainable farmers?

R: We don't have big problems in our area, it is quite a lot of production, but in our province it's not so bad as others. In others trees are right next to each other, it's not the case here. It's crazy, olive trees everywhere.

There are problems then with cross contamination, pollution, pesticides, etc. they go on your olives. Not in our case because we're in the desert it's easier. We have extreme temperatures so it affects the trees less in other places. So our environment is good for olive production, not so good elsewhere.

H: with the trees itself, what's the best way to reduce invasive species, pests, best practices.

R: 3 main pests, other small but not all the time. You can use conventional methods or organic methods.

The first is a fungus that comes. After you prune the trees it gets the leaves yellow. The conventional way is to use fungicides, conventional. We use copper, it is like a fungicide but it's not synthesised or petrol or whatever it is mineral. You cannot find residue in the finished product. So we used, instead of using the systemic product which is more efficient but we choose copper. We're in the desert so it's dry and we don't have as much fungus as other areas. The second thing is that, when the flowers are out and open as in now (may) we get a moth that gets inside the flower and gets in the eggs. So we get the worm that goes into the olive, eats the seed and the olive oil drops out when they are very small, like the seed and a small amount of oil left. So this normally treat with pesticides, we don't use that, we use a bacteria which is called, *Bacillus thuringiensis*, it's a kind of bacteria that is not harmful to humans. This is useful to treat against the larva and worms. It's organic, you treat today just the moths or worms, only! We have good insects so we don't want to kill them, that is why it is so beneficial for us. We have bees and other animals such other pollinators; they eat the less favourable insects so we don't want to eliminate them. To just kill them other ones? No. it's not in the final product, it's organic. It works so well, even non organic producers are using this because so effective, it is expensive but it does work really well. Perhaps we use a small amount, in effective areas. However, when you use a high spectrum pesticide, not in organic because we're not allowed. They use it and spend a lot of money, they kill the good insects, so sometimes when someone looks at their trees and don't see anything, something is wrong!

H: yeah

R: The third thing is the fly. The fruit fly that eats the olive, it goes inside the olive. They put the eggs inside too. Normally treated by high spectrum pesticides, not us. In organic we use thermal traps, some outside the farm to control the population of flies. When you feel they come a lot, you use a thermal trap, the second you use a trap with water and an attractive, it's a sort of fertiliser, ammonium. The flies go in the trap and cannot go in. You use a natural pest control and you use today and it gets out in the night, in the substance the chemical substance is not there. You only use that when we have a lot, we use the traps otherwise.

H: are you a cooperative? Do you operate as one?

We are not a cooperative, we are a limited company. We operate in our own way, production, distribution. However we do operate a service for farmers, non-organic who are local and organic. Farmers who are non-organic who want to change. Most of the smallholder farmers are changing, this takes around 3 years to happen. If you want to certify you trees, you need to have three years to produce organic olive oil you'll need to wait. We don't do a lot of production but we help the farmers. They either want to keep it for themselves or, half to sell here or half for themselves for example. But we help them with this service, we charge of course because we are a business. But if we didn't have this service delivered they cannot produce organic. We used to be the only organic olive mill up to 1998-2007 today there is one more. There is only two in the whole province. Where you can take your olives and get them milled organically. The others are conventional so if you grow organically but they mill them in a conventional mill they are not organic as a finished product. So we have a good relation with our other farmers because we expect in the future that is our estate will not cover our market needs, we can also buy the olives from other farmers, we need to teach them how to do that and produce a special product, because we produce high quality. When you harvest a ripe fruit, you get more olive oil. So if a producer is getting money for the amount of oil produced, it is much better to harvest when the fruit is ripe. We can teach them to harvest when they get better quality. Get paid for quality or for quantity. At the moment we cannot ask them, if we're not going to buy, if they have the oil for themselves. Instead of growing more, there is already production,. So why plant more trees? we don't want to plant more trees and use more water, they also need to sell their production. At the minute we have a single estate production, and we offer the service. But in the long term, future, probably, we will, not all, but the ones we have seen, that are

producing high quality products. And quite near to our farm. Where conditions are similar, and varieties, type of oil similar. Go to a similar joint venture.

H: What is your relationship with the other farmers and producers?

R: we are a special company like that, we are a small company, a family company. We don't feel so comfortable with the big buyers, who look at the business as profit. It's a business and profits are important. But the business is a special profit, it's not a premium for rich people, normal average people can afford it, it is not cheap but it's a quality product that goes into the market, in Spain and exclusively to luxury shops, delis, farm shops. It's small exclusive niche market. We export about 57% of our production outside of Spain in 2007. Organic production is easier to sell outside of Spain because Spain is not so popular. We produce a lot but do not consume a lot in general, that's an average. So outside Spain we export to EU and outside the EU later in 2010 to Japan, USA, Canada, Australia, it's not a big market at the moment, it's probably 6% outside of EU. EU is quite a mature market for us, there are some places we do not sell at all but we do well, , and the Japan, USA looks like a huge amount, not much at the minute but the same amount, potentially as big as Europe. We envisage this market to grow. The relationship with the buyers is important, most of them are small companies, or really convinced about quality, this relationship is close. We incorporate them into our philosophy and bring them here to see how the olive oil is grown and produced. Why it's like this? The product isn't cheap it's about quality and how it is done. It's a question of teaching and learning so we tried to make close relationship and give them information about it. Bring them here at least one. They know everything and then they can sell better. This takes time to find a partner like this, that is why we can't grow as fast as some others because. Sometimes there are companies that are small like us, for them to develop and grow, it's not as fast, but if you take a big employer who has a portfolio of 1000 references. You can have a big order and sell a lot but he doesn't care about you. We prefer have exclusive customers who want just good products and they can afford to have them and they will have us in the promotion and that is a good thing.

H: Is European or national legislation an asset or an obstacle to the operations of your farm?

R: the thing with organic product laws, I think it is fair, it has been established a long time in Europe. In the certification is quite easy to understand and it is quite fair. The thing is I think

personally, I think the way to control the farming is good but I think it can go a bit further than it is today. Today organic is free from chemicals but it's not necessarily sustainable.

I'm sure not all the people can be sustainable but I'm sure sustainability can go more than just organic, it's the only way to feed the world. We can feed the world in the future, and people say that if it's not so productive it's not possible, I think this is not true at all. Because we can see every day that supermarkets throw away food. So that's not the truth, people in the third world have nothing. It's much more about trying to re-educate the consumers and people in general on how to buy and to buy sustainably. Not only produce and sell, but buy too. That will get the prices lower. So lower the price and that will make everything easier.

Legislation in Europe is not a struggle for anyone. I think it can be improved for sustainability in the norm. try to make it standard in Europe then to export to the Japan and the United States to try to make them, if you look at them they're very similar, so try to make something for the world. If we fail, the international farming, it just costs money, so we need a piece of legislation that is globally the same thing. I am certified for Europe I am certified for in Japan, United States, Canada. We do the same thing. We don't do something special for Japan, it's just the same thing. I just have to spend more money to enter a different market which is essentially the same. In Europe we need to

go further in sustainability concepts. This is to link these concepts with organic farming and if it isn't not, and then control the selling point because the selling point is not always well controlled, people can say on the label it's bio, or eco, it's not organic, and these kind of thing. At the other side, there is not a big availability of production facilities at the moment.

H: What can you tell me about the CAP?

R: This is quite a thing in the news at the minute, 2013 has a new CAP for the next 5 years. I only have experience in Spain, I only know olive trees, and in Spain it's completely crazy. There is a lot of people that without this intervention in Europe they wouldn't be able to continue their cultivation in Europe because of the competition. I think they must make a redistribution of the rights, I find today that a lot of farmers like us are farming sustainable, organic, because we plant the trees later, we don't have a lot of old trees, we don't receive a lot of help, from the intervention, we don't need it to live, we do everything from the farm to the bottle we are not only farmers, but it's not fair that many people who have olive trees

and they don't care about them, just inherit the olive trees from their fathers, they have them in the mountains where it isn't as productive and they don't prune them.

These people are given a lot of money to maintain them which isn't good because it's producing erosion, because the inclines of 40/50% it's absolutely crazy, it's not profitable. You've seen the mountains. And they receive a lot of money, and the people, these farmers, some, are using this money not to improve their production, they buy a car or a nice house by the beach. I mean everyone can do what they like with the money, but it isn't fair that you receive money to improve your facilities or production. It's not all the farmers of course but some. Some younger farmers with new ideas, quite productive and sustainable, not only environmentally sustainable, but socially and economical, profitable, new, produce a good thing, like today demands. They don't receive a lot of money, the older plantations receive a lot more money than these new ones, by right. I'm not pretty sure that this is fair, I don't think we should not leave the old ones with nothing but they must improve production or use the criteria of sustainability to give them the money, not because of traditional rights.

Finish that and then, redistribute the rights equally. Of course if you produce more you receive less and if you produce less you receive more. We shouldn't just give a bunch of money for farmers, which is quite big but only possible with the intervention. So control this then also improve the criteria for receiving money, because we are in Europe we pay the workers €60 per day and outside they may pay €10, so we cannot compete. But the CAP has made some good things, because much cultivation is continuing so profitable, without it no. This is just to help, the future, the farmers must be profitable by their own production, the intervention is just to help to do the things better or improve systems, irrigation, it's not the objective it's just the help. They must believe that probably in the future, with the financial crisis, that this will stop. This will be the end of everything. If you prepare and learn yourself and you anticipate this in a proper way, you will have success because agriculture is something we always need, to eat. But if you're employing the money in a bad way we'll probably be out of the market in a short period of time. So that's the thing I believe about CAP, it has good things and some bad. I don't know what will happen in the future, I am in accordance with some of the things but not all. The main thing is how they should redistribute the money.

H: what can you tell me about the staff working here?

R: Okay, so in our company, take into account everything we have the factory, the estate, the restaurant and apartments that we rent. We employ 12 people (including family members, 5) and then 7 workers. They are 12 months. Then 20/30 for harvest over October and November, just two months. So we try to give conditions to our workers, they are right of course, they deserve them. Most of our workers are fixed, they don't look into our company and just see that they are coming to work, for money. Of course this is the main thing. But when they sell the oil they don't say the oil from my company, from my boss, they say our oil, that means they are involved. We try to involve them, it's not only work, that is important but also the ability to have their own small parcel of things. Even if they are just bottling the oil. Our success is not just because we look after nature, we work, I manage with the commercial side and management, but if I need to get into the production side to help and do everything I will. We try to look after them. As a family company they are not just workers, they are like a family, they work with us 12 years 15 years sometimes, so it's kind of like a family. All these fixed workers are from the village, we need to employ the people who are here. The people I employ for the harvest we offer the work to everyone, but most the workers we foreign workers, because Spanish people did not want to work in the fields because it is hard work, they didn't want to because they had alternatives, but with the crisis and unemployment, also Spanish people want to work there. We have people coming for the last 5,6 years so why to say no? we give them the work if we can. They may work in harvesting the tomatoes and such like elsewhere. But most of our workers are from Romania. I understand the situation because my grandfather emigrated in the 1950s to France, he has been living there for 30 years then he return here. My uncles still live there but my mother and father has returned. So I can imagine this, when someone finds work they bring the family their friends, they are all from the same village, or around the same region. They find a place where they can live and work and provide for much more people. Of course when they came 10 years ago there was a lot more work, and now there are many unemployed, some of them have returned to Romania, some of them not. We try to give them good conditions, the minimum salary is paid, but sometimes we try to do something with them which is good for both of us, if they harvest more they can earn more, so basic and if they make hard work, they can earn more, they separate their harvest into individual boxes.

H: Like an incentive

R: Yeah, but we do not force them to work for money, but just to help to produce more. Harvesting olives is hard work, and if you don't control the people or give them an incentive, to do something better the cost is high. We have mechanical harvesting, for the middle aged trees, we shake mechanically, but the very young ones or the really old, we cannot. We employ people for doing labour works around the farm such as, we do not use chemical so we need to employ organic methods by hand. We also have grapes so we employ people for that. Not a lot, 30,35 around the year.

H: You cannot employ everyone...

R: Unfortunately no, this will be never with our estate. But our objective is not to get huge quantities, ours is to keep quality. Not so small because companies need to grow to be profitable but we don't expect to be huge. Even if we sell a lot, we'll find the maximum then we can go to pricing or rate, not for massive production because the quality will descend for sure.

H: Are you concerned with climate change?

R: Of course, we are in a desert, a place where our whole life, but because it's not like the Sahara but you can see around, it's the Mediterranean but it is an extreme Mediterranean. It's not like other places, normally the average rainfall is 150mm per year, so it's quite limited, the average in the Mediterranean is around 500, 600mm. so this is much more. We always adapted to quite extreme conditions. Other areas in Spain may not improve their water systems because they always have water available.

Normally, when they have a drought one year it is like a crisis, but here there is always a drought, there is always a "crisis" it's every year, we are adapted every year. Of course with new irrigation systems such as drip irrigation allows us to produce more than we did before, because Almería is one of the driest places in Spain. It's one of the places with more water under, in aquifers. But if you take a lot of water out of the wells this will be bad because problems with fragility of water supplies, the aquifers are really fragile, compared with surface water. The one you can see is absolutely different.

When we pump the water up we use solar energy, when the trees are young we use water a bit more to help them grow, but when they are already growing, to improve the quality and save the water, we reduce the doses of water each year so it is less and less and less, of

course not nothing, it's impossible but the doses is smaller each year, until there is a limit. Of course climatic change is important but the extremes are already here. I'm not sure what will happen, if it can get worse than today, all we can say is that if the population explodes the water from downstairs, the aquifers, this will be a big problem. We have a chance here in Almería we have the desalination plant, this is only working 20% of capacity because there is not enough infrastructure to bring the water to where we need it. To pump it up to this area would be expensive but that can be paid by the farmers, and users. But to have water that is expensive is better than to have nothing. Here the fact is to try to combine a way of meeting demand and try to make it sustainable. We irrigate next to the root, underground, so we save water because the irrigation on the surface causes evaporation. Evapotranspiration is not a problem. So we try to help in our way, but this does not just depend upon us. Its all the farmers, many of the farmers do not care, they just take the water and don't care about tomorrow. They just think about today, today, today. We cannot solve climate change by our own, we need to convince other people too, many people don't think about this, they think it is something to do with green peace and people which is crazy. We don't know exactly how it works because there are a lot of factors at play, but we can definitely start and do something now. We cannot wait until something happens and do something in the moment, we must act now. But unfortunately it is quite difficult to convince all of the people. Honestly though, the people here in our place is aware about that because we already have problems for many years, we don't think we'll have a desert, we already have one! But of course I expect the people will change their mind because if people do not change their ways now we will have big problems. So let's see what happens. I feel that over the last 3 or 4 years we have had extremes, not just in Spain but all over; drought then this year in Spain it rains like crazy. It's not natural, it rains when it shouldn't then the flowers open, they then get burned because it is too hot, it's not even good. It changes the trees. Like April hot, then cold, it makes the cultivation change, they give flowers early, then again in May, and so this is not normal for the olive trees. So at the end the tree get stressed and poor productivity. So in a big scale, it's a problem everyone needs to be concerned and cooperative with others. We need irrigation drip, in all. If you water your trees a lot you get very green leaves and a lot of olives, but the olive quality is not so good, because there is a lot of water in the olive. So it's not such a good idea.

In Almería water is the biggest challenge, other places it maybe soil quality or other things, but here in Almería it is water. The pollution is not the problems, only almonds and olives, but if you go to the green houses; plastics, herbicides, pesticides, residues, and water!

Here it is quite clean, rural natural. Water is the problems. The trees down the road the trees are so close together this is completely crazy, it's completely unsustainable. It's not fit for here, not for here. Maybe in Argentina, or places where it rains a lot and they can produce a olive trees, other places, but not in the desert. Organic or non-organic, it doesn't matter, but traditional, 7m distance per tree, less trees per Ha, so less productivity per Ha, but not as much income. I hope these will have big problems, they have a lot of fertiliser a lot of water, a lot of electricity, a lot of diesel (tractors etc), and it's a big problem.

H: Las quarto Vegas, what can you tell me about, do you have any involvement?

R: no we do not but a problem is that the rights for the water must be there, you cannot extract the water unless you have the right to do so. Some people take what is not theirs. There is a common well here, we pump, fill a reservoir, when it is gone we fill up, so we save on the diesel, try to improve the system. Control the water supply so we can use it effectively. We need to let recharge occur, these aquifers replenish themselves so we must wait. 90% of water for villages, industry, comes from well.

Farmers do what the market demands.

END OF INTERVIEW

2. Rafael, Almazara de Lubrin; Lubrin

H: Interviewer

T: Translator

R: Rafael, General Manager at Almazara de Lubrin

BEGINNING OF INTERVIEW

H: 24th, 4.20pm. So could you tell me a little bit about your farm please?

T: Can you tell him about the work?

R: Look, this is about the following; this is where the olive oil is processed. The olives come directly picked from the tree and what we do is turn the olives into olive oil.

T: He says the olives come from the trees and then they bring it here and turn it into olive oil.

H: Brilliant, ok.

R: Ok, so what else? Do you have any questions?

T: Do you have any questions you need to ask him or anything?

H: Okay yeah,

R: I prefer to be asked and then I reply

H: Okay yeah, that's fine yeah; do you use anything like pesticides on your olives for them to grow?

T: Do you use anything in the trees for the olives to grow?

R: Well I use water from underground or from the sky, and well you also add liquid fertilizer for the olives to grow.

T: They use water from the floor or rain for the olives to grow.

H: Do you produce any organic olive oil?

T: Do you produce any olives, or organic olive oil?

R: Yes we grow organic too, the organic one is properly documented, the company is certified, this means, in order for it to be organic, they have periodic inspections. Then this finds out if we are doing it properly, if we have done all the requirements. What do you do? Well, a residue analysis to compare if there has been anything other than the usual.

T: Yeah they do organic, but before they do that they need to have an inspection to make sure it is okay and have a certification to say it's fine, and they use that to make sure it's...

H: Organic

T: Yeah, to make sure there's no problem with it.

H: Brilliant yeah, why do you farm organically and non-organically?

T: Why do you do it organically and non-organically?

R: Because when you do it organically, the lot or the farm where you grow these olives, when you do it organically the repercussions are that production and profitability are reduced. Because when production falls you make less money. It is true, organically you save a lot of money, but it is better to do both. That's why it isn't all organic, we do both. We call conventional to the normal way and organic to the organic.

T: Ok, Just in case, how do you call it? Organic and...?

R: Conventional

T: Inaudible... What he said, you can lose more money than the other way, because it isn't the same, you can lose more money than you make.

R: It means, if a tree in conventional conditions produces 50 kilos, an organic one might make only 30 kilos. That is the difference between organic and non-organic.

T: Because they do it both ways, if you do one way you can lose money doing it, on one way you can get like 50 olives the normal way the other way they lose money.

H: Yeah I understand, all the farmers have said it's financial, it's money.

T: Yes, they have told him it is to make money.

R: It is very reduced, according to people; some say that organic gets to a point where it isn't profitable. But why go organic? Well you might not have that much water or the necessary means so it produces. What do they do? They make it organic, what can happen? One year it produces olives, the other one, doesn't.

T: It could be one year of good olives, the next it might not be as much. They do it so they can have olives all year round.

H: How important is water in your farm?

T: How important is water to the olive trees?

R: A lot, everything, especially in Almería, in Almería, it is everything! Here we have little rain, if it doesn't rain the olives stop, they do not produce.

H: Thank you

T: It is very important, especially because it doesn't rain a lot here so if you haven't got water you haven't got olives.

H: Yeah, where do you store your water and how do you irrigate your crops?

T: Where do you store the water, where do you have it here?

R: From underground wells, then you usually store it in a reservoir. Each farm, each owner has his own reservoir. Then from the reservoir you draw water.

T: And how do you irrigate?

R: By drip feeding

T: Right they keep it in, have you seen those pools? They keep it in them, yeah but they're not pools they're like tubes, just like watering...

H: Yeah I understand, do you have any problems like theft of your products?

T: Do you have any problems with people stealing your product?

R: Sometimes you get a bit of that

T: There is sometimes.

H: Is it much of a problem or is it an annoyance?

T: Do they do it a lot?

R: They do that very little

T: They don't do it as much so it is more of an annoyance.

R: When the olives get picked, whoever picks them picks during the day, and then they bring them here in the afternoon so that the olives are safe.

T: What people do is they pick the olives in the morning, then they bring them in the evening so people can't nick them. They are really safe.

H: I've been to *** de campo and I've seen your products in a shop there in a bar, how hard is the competition in the area?

T: That he has gone to Uleila Del Campo and has seen your products in the stores and in the bars, how is competition with other sellers? How is competition with other people?

R: What difference is there between my product...

T: If you have much competition with other producers?

R: Yes, with other producers, more producers than manufacturers.

T: Yes

R: Yes, everyday

T: They always in...

R: The one he mentions in the conversation, he is my competition.

T: You know the person you spoke to in whatever?

H: Yeah Rafael

T: That's his competition as well.

H: Main competition? Really?

T: Yeah that's his competition

R: But we are friends

H: Oh yeah friendly, I see. But competition is a big problem, what do you do to try and get a large share of the market, or more customers to buy your products over somebody else's?

T: What do you do to sell your product to more normal people? How do you sell it?

R: Look, we make it, a part of the production we sell bottled, right? The other part we sell it wholesale. Wholesale I agree to contracts of 25,000 kilos y and I sell it wholesale. Who buys it? Well people who use it to bottle it and mix it with other oils and sale it. See?

T: What he normally does is he sells it in bottles and then he sells it like in big bottles so he can mix it with other olive oils and sell it.

H: How many staff do you employ here and what is your relationship with the people who work here?

R: Here people who work during the picking season from November to February are around 7-8, otherwise only 2-3.

T: Form November to February they've got 6 people and then out of that time there is only 2 or 3. And what is the relationship like?

R: The relationship with the people?

T: Yes

R: It is very good.

H: Yeah good, I'll move on to the environment question, do you have any feelings, like strong beliefs about the environment? Do you hold it, can't really think of a word, do you hold an opinion on ecology or wildlife like insects or birds?

T: What is your opinion regarding culture surrounding wildlife and all that? Culture in general?

H: The natural world

T: The natural culture, your opinion?

R: My opinion is about agriculture, well in Spain, agriculture is one of the principal engines driving it. Nowadays it is what is practically holding Spain up, especially Almería. Why? Well because what comes from Almería, we sent tomatoes and cucumbers, and all that olive oil to England, Germany and Holland. The olive oil is a problem, Spain exports but Italy is 20 years ahead of us in commercialization, sales and all sorts. What happens is Italy comes and buys the olive oil from Spain, takes it to Italy, packages it and sends it to Germany, England, Japan and America.

T: Agriculture, one of the things you asked for, it's important here. It's one of the things Almería needs most, it's like olives. Then need it and they use it more. Because they say all the olive oil goes everywhere else so it's quite important for us.

H: What's your opinion, the, I don't know what they're called, but all the plastic greenhouses by the sea? The horticulture that's, you've seen them can't you? You can see them from

space, next to Almería city there are lots of greenhouses. What's your opinion on them? Is it good? Competition is it good? Good for the environment? Bad for the environment?

T: Your opinion about...

R: About what?

T: If you go to Almería, to the airport, there is a place with a lot of greenhouses

R: A lot of greenhouses yes,

T: What is your opinion about them? Are they good or bad?

R: Well, if it wasn't for the greenhouses you possibly couldn't eat tomatoes, cucumbers, peppers, it is a chain. There is nothing completely good in this life. But there is an industry, a power plant that is producing electricity and polluting. Yes? They say the effect of the greenhouses is not that bad.

H: I was near to Tabernas, near to Rafael's place, and on the long road there is a new olive oil plantation there, loads of rows and rows of olive trees. It is really industrial, high energy, that's competition that's another market share. What do you think about these big farms that are really intensively farming?

T: Your opinion if you go near Tabernas there is a greenhouse, but they have loads of rows of olive trees and that.

R: that is what you call and is catching on in Almería, many olive trees, super intensive. With that method they seek maximum profitability. Low economic cost. They mean to produce 2-3 years from when they planted them. You are supposed to get a return back after the third year. So that is what it is being used now for, to make more money and to recuperate costs, for this you have to mechanize it all.

T: He says at the moment it is not very good business, after 2-3 years when they start getting the olives and that, there's a really low cost in that. So at the moment he says it is for olive oil intensive but it's all done with machines and all that stuff.

H: Yeah, do you farm similar to that even on a small basis?

T: Do you do that even on a small scale?

R: Yes, 10 days ago

T: 10 days ago he did one like this.

R: I have planted some little ones, and I have some big olive trees.

T: He has some small ones.

H: Myself personally, I know you need to have organic, non-organic, industrial and traditional. You need to have a mixed approach. For me personally I think it's ok, but the reason I'm trying to see, what the issues are? If people farm... if farmers farm for economic

reasons organically or non-organically, what are the challenges? What are the problems? You've answered pretty much everything and there is a common theme amongst other farmers with all these challenges. He's answered some good questions.

T: You have answered him well.

H: What I will say is what I got from that, what I understand, I understand is that you farm a mixture because you need to have the economic security there, organic, non-organic in order to keep the financial profit there.

T: What he's understood is that you need to have organic and non-organic to have safe profits.

R: Yes, let's see, so he understands, olive growing is a business ok? A grower has 50 olives, that isn't a business. But someone who has 300, 2000 or 5000 olives, he looks to do business. You see?

T: When somebody has like 50 olives they got no way of making money, but if they have 300 and above you can get money ...inaudible...

H: Is there some farmers that get money for their olive farms, they get a subsidy from the government because they own farms and the olives. Or they only farm them with a harvest.

T: Is there people that have their field with olive trees, but they receive money even though they leave the tree ... inaudible...

R: That is called help, from European union each farmer gets a set amount of money, yes? There are farmers who receive 500 euros and others who receive 3 million, in relation to the amount of surface they have planted.

T: Depends how big it is, that is how much money you get. Like someone who has 3 metres square will get less than someone who has 10 metres square.

H: Do you think that is fair?

T: It's more like he says its help.

H: Do you think the current system is fair? The common, the money, is it a fair system? Or is there anything he would change?

T: Is the system fair?

R: Yes and no, because they did that, they set it up 6-7 years ago, and Almería for example, the olive trees are small, very little olive production, so they averaged the last 4 picking seasons, and since there was little production the farmers started getting little help.

T: Do you receive help?

R: Yes, because I have plantations, I have olive trees, I get help.

T: Inaudible

H: I've got no further questions, that's been really good.

T: He doesn't have any more questions.

R: As many as he wants, you should have told me, I would have told my wife, she speaks English. IF I would have known they could've spoken in English, it is easier. IF you have any more questions, you can ask me in the afternoon.

T: He says if you've got more questions in the afternoon you can come back and ask.

H: really? Oh that's really nice, it may seem small to you but for me it's big.

R: I want to ask him a question, the work he is doing, is it related to olive oil?

T: The work you are doing is it to do with the oil?

H: It's more the people.

T: It's more the people and how they use it. Also the people and crops.

H: The people, their relationship with the land, any challenges they face, why they farm sustainably.

R: Anything else?

H: Unless you've got anything you've got to say to me, anything you think would help

R: If one day he wants to do his work about olive oil we are here to help.

T: If you want to do any other work with the olives you are welcome to come back.

H: Thank you

R: Delighted

END OF INTERVIEW

3. Paco Fransisco; Sorbas

H: Interviewer

T: Translator

P: smallholder organic olive-oil farmer

H: As much as you want I can translate Spanish to English

T: Can you? Can you understand?

P: What can you ask briefly and explain what does the farmer grow, and what type of agriculture do they like?

T: and your answer?

P: Yes I like ecological farming.

T: He likes ecological agriculture

P: I like ecological farming because it respects the environment in which we live in.

T: He likes it because it respects the environment

H: Ah brilliant

What we have here belongs to everyone. Today if we plant wrongly, tomorrow we harvest wrongly. Everything which we (as humans) have planted has resulted in pollution; we are ridden with cancer and crap. Let us see if we change a little and live a lot better.

T: Very good, go on, number two

P: As an organic farm... what is this? I do not understand this very well.

T: As an organic farm... but you don't have a farm.

P: That's why, not that one, I don't have a farm.

T: That's why, number three, which are your biggest problems or challenges as a farmer, how to maintain and increase the quality and fertility of the soil.

P: Well that you get by treating it, using things that are natural such as organic fertilizer, or in this case manure; or you can be productive by planting what can be lentils that you then cut are process and you mix with the soil. That provides fertilizer to the soil.

T: And the manure? From where?

P: Well that has to come from animals.

T: But for you, does it come from this area?

P: For me, yes. I buy it every year from a boy that has precisely goats, that has the cattle down there in the cortijo.

T: I asked him where he got the manure from.

H: Ok

T: He buys it from a friend's goats.

P: But the ground maintains itself in that way too I tell you, you can plant what are lima beans, lentils or leaves, and when the plant is big you can cut it up and mix it in with the soil, and that provides organic fertilizer to the soil.

T: Number 5, where do you get the water from? Richard?! Are you going because of us? We'll only be 5 minutes

...inaudible

T: where do you get...

P: The water, the water is used normally in the zone where we are through well extraction. We are lucky we have plenty of subterranean water, and here the water mostly is abundant. But less than before.

T: But less than before! The level keeps going down because of the farmers.

P: I have always said that why do they let those farms which are so big, so intensive, have planted trees between one to two meters of each other. Those types of farming can't be done in places with water scarcity, besides in organic farming that type of farming is not allowed, it is not authorised in organic farming.

T: That is one of my questions, that is not on the list, how many meters apart do you plant your trees?

P: The first ones I plant them in 8 to 8 metres.

T: 8 by 8 because he says the intensive agriculture is very bad

H: Yeah I understand

P: 8 by 8

T: Aaaah six, what is the best way to prevent disease in the trees.

P: How can you use water? Well as water has been being used during watering and well, to try and make the best of it.

T: You use drop by drop?

P: yes, I water everything drop by drop. You have to make the best time when the sun is not hot, because what the sun does...

T: at night?

P: We have evaporation hence we have to water so that come 10am that plant is watered , we can't water when the sun is out, the sun what it does is drawing the water out. Not many people do that.

T: yes, some people water 24 hours a day.

P: We are wasting and throwing away water, it is a shame I tell you, since we are in a place where there is little water.

T: The best way to prevent disease in your trees

P: Disease in trees in organic farming is practically self-regulating, it is not a tree where you add product, pesticide. What this does is create more disease.... The tree in organic farming reaches a stage where it has no disease; it has no disease because you don't kill any bugs of any kind. Nature is very wise, they compensate themselves, then the bugs eat the bad ones, there is always a biological cycle that does not deteriorate.

T: The organic trees in 25 years don't have anything, and have perfect health!

P: of course, and of course if you have those bad bugs, then the good ones take care of eating them, not then, if you treat with pesticides, you are killing the good, the bad and the ugly.

T: of course.

P: Now, this way you don't, on these there is a type of bug, that red one, that little red bug con those black spots, that is a devourer, that does nothing more than eat.

T: He says ladybugs are wonderful

H: Ah yeah

P: Do you know which one?

T: Yes yes yes

P: That doesn't do anything else but eat. That is man's best friend.

T: Seven the vulnerable ..inaudible.. the competition of industrial farms. That doesn't affect you. Eight, can you tell me about the staff that has worked here?

P: I use people for the picking, but the day to day maintenance is all done by me. I am like a donkey I When I finish early I go off to look after my trees. I am blacker than the blacks!

T: Nine, how do you see the scarcity of resources, such as water, quality of soil as an issue.

P: Well here we have what can be a problem, the water here will come a time when it will be a very serious problem. The quality of the soil no, because if you farm ecologically the soil is richer every time.

T: But for you personally, in this zone drop by drop you don't find problems with lime o chalk due to tubing?

P: Not me.

T: You don't drink water that has too much of it?

P: It depends on the site y water varies from site to site.

T: exactly, but your land doesn't have that problem?

P: Me completely, the water I have, when I did the testing, I was in the lab that there is in huercagovera. I analysed the water, and that man told me that my water has better quality

than many bottled water for human consumption. That water wishes it was as good as mine.

T: He had his water from his well analysed and the guy in the laboratory told him his water from his well was equal or better quality than that sold in bottles.

P: Because of that water quality, the water and sun is everything, water and sun is everything. From that product that I raise with all the caring in the world, comes a quality of oil that is beyond, why? Because we have, the farm is places in a spot where from when the sun comes up in the morning, until it sets in the afternoon; it is shining on these plants. The water is very good so all this comes together.

T: That is why this area is so lucky.

P: Then production, the results, quality is amazing, it is something beyond. What we need here is sun and water, and because the quality of sun and water is good, production is amazing.

T: But you also need soil quality.

P: Yes of course, but soil quality comes that way.

T: Plenty

P: Placing and providing nitrogen to the ground.

T: Ok, ten, do you receive subsidies from the European Union?

P: Me? Practically nothing. Because one is so unlucky, if you go around blind, What I did, well I had the land there, lands of my wife, and well when I've been able to one year I've planted a bit, another year another one, and so on. I never have thought in something that is subsidies or anything like that.

T: That's why you've never requested subsidies?

P: Me, yes, I have, and I get very little for being in organic farming. However, but is its very little because they give a lot to the big farms that are around, they practically live because of the subsidies, they are not lacking in production. But me as a regular, they subsidize you according per kilo of olives. During the last five years I produced at half capacity, and hence they gave you some help; of course, the trees were small and in those five years I didn't sell olives, because I didn't sell olives I have any right to subsidies, I have no right to help.

T: The subsidies are then for olives, not for trees, not for planting trees.

P: Of course, but then...

T: Eleven how would you like the subsidies to work?

P: Agricultural subsidies should be the following way: The following way is that the dude who looks after the farm and the dude who produces and that knows how it really works,

that man needs it. Not to have the trees all dead festering plagues and disease, they don't even cut them or fix them, only because of the subsidy and the aid, that shouldn't be allowed! The one who has to receive subsidy and help is the one that works it every day. That's who needs it, not because they say here I have 20 hectares or 40 or whatever and they leave the trees to dry up. I plant them there but at the end of year I extend my hand and that's how I live. That doesn't work, the subsidy has to match the dude that everyday worries that plant is in a perfect state.

T: That's why you think they need more inspectors to see the health of the trees?

P: They know, they don't need more inspectors or anything, here with the technology we now have, you only have to look with radar at specific fields and parcels from above to see how the crop is. The inspector doesn't even have to set foot on the farm. He knows if that parcel is looked after or not. If that plant you see it all nice and green, beautiful, you say, that is well looked after. If you see it all dry and unkempt, today with the technology we have, we don't have to walk around the fields by foot.

T: finally, you can summarise your life as a farmer, the best parts, the worse parts, your personal vision regarding the future of agriculture, and everything you can think that you might find interesting. I shall sit down while you talk about your life.

P: I think the following; agriculture is something that young people don't want, because it is tough, it is a very sacrificed thing.

T: Yes there are few young people

P: But it is very beautiful. Agriculture is beautiful and it is something pretty. A plant which you have planted tiny, and it's been 1-15 years and it is a big, beautiful plant, giving you production, that is, to those who like it, I like it more, I love it; to see a plant, that is like seeing a son grow. I love them next to my son, me? I love a plant like a son.

T: Of course, I think just like you, If you go to Urra, you see some trees, now they are quite big which I have planted as seeds. And now the almond trees produce many almonds and all the trees you see I have planted from seeds.

P: Besides all that, liking your job, because I like all this, I like, at some point I want to live only from the field, and not have to live of those cars which are a hell. The countryside is peace and harmony, it's glorious, that is; well besides all that it is something very important that people don't want to admit, or that we have lost our bearings, or that things how to work properly. It is what I have said, before subsidies. The field has to work always because here there is nothing else. If we live it is because of what we eat, if we don't eat we don't live.

T: He is saying if we don't eat we don't live.

P: And there is no other way than what comes off the field or the sea. There is no other way, don't go anywhere else, than when we sit at a table and we like to eat a piece of ham because it is so good, also we like a nice little olive, a good salad or some pork chops or whatever, it all comes from the land or sea, a good fish.

T: Of course

P: That has to be taken care off, more than all these politicians are looking after it. All these misters in high places, they look after it really little, because now I just filled up with petrol to be able to produce these olives, it shouldn't be that the price of a litre of petrol used for farming be this expensive. The fuel used to draw water to water a plant, when then they pay for the oil you produce at practically nothing, of course, that is another story. They pay practically nothing, the guy who buys it off you. And then they trade it and sell it in England or they sell it somewhere else. They sell it at the price they want to sell it, that cannot be, they should have some prices so that the one who produces it can live honestly, and well that is why he has produced it.

T: Do you use a tractor?

P: HA! Look what tractor I've bought! Come and look

T: Aah that is yours?

P: This I've changed it instead of one I had.

T: That's why you cannot complain about petrol

P: What?

T: That's why you cannot complain about the petrol you use.

P: They have the prices too high, that is what I'm telling you, they have some really high prices, the fuel for the tractor.

T: Yes of course.

P: Too high, I haven't even registered it yet, I just bought it two weeks ago.

T: He just bought this new tractor.

H: Yes that's nice, really good. Brand new

T: But he's been complaining about the price of diesel ...Inaudible...

P: This is a wonder!

T: Okay Paco, thank you very much, I will find you tomorrow around noon.

H: Thank you very much!

END OF INTERVIEW

4. Justo Sanchez Martin, Cortijo el Cura; Laujar de Anderax

H: Interviewer

J: Smallholder organic-olive oil producer

BEGINNING OF INTERVIEW

J: Well now I will sit down ...inaudible... let's see, come in the house. This has.. ah! I don't understand this, do you understand any Spanish?

H: No

J: Oh dear, you study organic farming?

H: Si, and Rafael Alonso, he goes English and Spanish.

J: Good man, you want me to talk, yes?

H: Yes

J: Well, when I started doing organic farming, it was because intensive farming was used a lot, and it came out that it ruins your health, that's where the idea of doing organic farming came from. After many years we have realized that the chemicals don't do anything more than damage our health. So that was the motive of doing organic farming. Does this have enough battery? Charge? It's that... the problem?, organic... no real problems as such, for me, it is more about, having healthy food, so organic is what is right? Natural okay.

J: I don't understand the third question, oh well, the next one then.

H: Thank you, what stop?

J: No! No! I speak!

H: okay, thank you

J: There we go. Look the problem is that I am trying to improve my health, and what is everyone else's health. That is my challenge. So, what we are trying to do is go to the school and talk to older people so that they know about organic farming.

We don't put any fertilizers in the soil, only organic matter produced by trees, you chop everything up and you mix it into the soil, cuttings and that sort of thing.

The water we get from a spring and only use it on the orchards and for the vines. We deal with disease in the trees by just clearing it out, cutting out the area, and the centre so it gets some air and doesn't develop a fungus. The Mediterranean fly that bites all the trees, well that you deal with by setting up a trap using sugar or vinegar.

Well the important thing is to leave the plants and animals to live in freedom no? Well we have a small chicken coup of about 30 hens, and these 30 hens live in 2000 square metres. That is the best guarantee that the product will be of good quality for them, it is the same for the olive tree, I find natural is better quality.

I like the fact that everyone who works here respects the environment, that is what is important. That they not only come to work for the sake of working, but that they see that nature is as important as life itself.

Well the problem is that now water resources, well the water is being used uselessly in doing worthless things such as bottling it and things like that. There is a lot of waste in those larger farms; they water all day and into the night, every day!

Well, up until now, this farm was set up based on subsidies. But they're not normal subsidies, but they are help and support that they gave us as entrepreneurs of organic farming and maintaining the environment.

Agrarian subsidies are important, what happens is that you cannot just give the money away for the sake of giving it, money should be given with a common guarantee right? Money should be given to the farmers who grow ecological. You shouldn't just give it to sell products. Not give it or the sake of giving it.

Man, I say that as a farmer, I have been one all my life. The farmer who only thinks of farming for the sake of farming, you can't live off farming. The farmer has to be an entrepreneur, like any entrepreneur that has to set up his company. Another way of having it and getting a profit in whatever you do. Being a farmer for the sake of farming, no. The product, you have to transform it into something.

Well, I take the olives to Oro del Desierto, you know, Rafael?

H: Yeah, Rafael Alonso,

J: Ah yes the younger, and his father, so I take to him because I can get organic certification, the organic mill there is essential for that certificate for me to produce otherwise... I have my vines, but that I can do myself.

Man, the future of agriculture, I think it's not just the future. It is the present, past and future. Because from farming we all have to eat. We cannot think we are going to eat from a plane or a moon rocket. Farming is food; the others are things that you can do to make life easier. But everything has its place.

Man, what is important is that you have good luck on your project. And if this is of some use, then good. The truth is there are a lot of things we could've talked about, but unfortunately me not knowing English... this stumps my thoughts having to talk into a microphone and not speak personally with you. Well I do think this will be of some use. We are family farmers, through many generations.

What we do think is that farming is the principal means of subsistence of humanity, and organic farming is a symbol of the healthiest farming in Europe. From then onwards, anyone can think what they like. We are responsible for our own actions, right? And we want the world to respect us, at least as farmers. Well many thanks for coming and hope all goes well. Thank you.

END OF INTERVIEW

5. Andreas; Lucar

H: Interviewer

A: Smallholder organic olive-oil farmer

BEGINNING OF INTERVIEW

H: 25th of the 5th, 1pm Andreas

A: The question is, can you briefly describe and explain why you became a farmer, and what aspect of farming do you like?

H: Yes

A: Well... really because... I am ex-military and am retired, my father in law had this land and I carry it on outside my job, there is no other explanation. It's easy. I do this as a hobby more like it, a hobby.

H: Yes, yes.

A: Not professionally, Maria is a professional agrarian, me? No!

H: Ok

A: What is your biggest problem? How do you maintain the quality and fertility of the soil? The soil we treat it using animal manure, but I buy it off a farm and mix it and turn it for 2 to 3 years, then I put it in the soil and do the same every year. Every year it is the same, I buy manure, mix it and then turn it a couple of times.

H: Ah yes

A: The water, we here have just about enough water, not very much. Pretty much just about. We can ration it with reservoirs. I have a well to extract water and two natural springs. The water comes out on its own. Then I accumulate it in a reservoir, I have three swamps, three reservoirs, that's where I keep it. One has 20 million litres, another 2 million and another 1 million. A total of 23 to 24 million litres. I keep it there and then in the winter I accumulate water, and in the summer, I use it to irrigate the fields. The reservoir is quite high in relation to the fields. Using the difference in water pressure, I manage for the irrigation system to work hydraulically. Extracting with a lot of pressure, with 5 kilos of pressure you can use it for a large space. All this is done using the level differences by using the water pressure. Then the water well, I extract it using solar energy; with solar panels. The sun makes the water pump work, the pump has 5 horsepower, I draw 10 litres per second during 8 hours a day. Then in the two springs it comes out on its own, you don't have to extract it. Then it goes down to the reservoir, and then the process which I have explained takes over.

The question, which is, what is the best way of preventing disease in the trees? There is no way of preventing it, rather, the crops we grow is organic, it works on its own; because the diseases, they kill themselves, better yet the bugs that eat the bugs that attack the tree.

Prevention is done by using natural products, sulphur, copper, mineral oils and certain diseases you deal with traps. The bug comes and sticks to the trap, to know the amount of bugs that produce the disease. You also use bottles, some water bottles with little holes in it, they have mostly wine vinegar. The wine which comes out bad, I put in the bottles, and then between June and July I place them every three trees. This releases the smell of vinegar, so the bug, primarily the olive fly, this is the one that goes in and doesn't come out. You also use that yellow plate where they stick, and then they can't be unstuck. The second one you look with a magnifying glass and then you calculate the amount of bugs. And with that you can treat the crops, with the products I've mentioned, o other types of oil like palm oil, and another one made of algae. If there isn't a significant plague, then you do nothing, it is preventative mostly, sulphur and copper to prevent, mineral oil and now, during July, the bottle and the yellow plate.

H: yes

A: The organic fertilizer and disease prevention is done very little. Yes, if there is no plague, then nothing. If there is much plague, then you have to act! Or there isn't, but the very same crops defend themselves against disease with their own bugs. It is not a big problem.

Farm nothing.

In the question about the staff who works here? Now, in the farm, there is a Romanian. Why? There are a lot of people asking for jobs, and this guy that came to pick olives and he was good at it, he stayed around. I've employed him for 6 years. Romanian.

H: Yeah Romanian

A: Very well, resource scarcity is a problem for all of human kind, earth in general. Resources, water is really important, it is the key. If there is no water, then there is nothing. The soil here, you can work on, well like we do; with more or less traditional methods, to clean and trim the trees, it is all very manual, with modern machinery, but mostly manual. For example in the soil, we don't use anything toxic, herbicides for example. We work it a lot. Do you understand what it is to work the land?

H: Yes

A: We work the land, you can get plants itself to be fertilizers, when they are large you chop them and you mix them with the soil.

H: yeah

A: The same as you mix manure, soil regenerates itself, there isn't a problem. The European Union funds, the government subsidies. Here the topics of interest are olives... let's see cereals, olive groves, almonds and vineyards. I have all those 4 things, I work the land. All of these in the topic of farming are subsidised, not much, but a little, some help. Generally the entire farm is subsidised with one thing in Europe that is called PAC [CAP]. Partly with PAC [cap] and partly with organic farming.

H: In English we call it CAP, C...A...P

A: Ah yes, well CAP

H: In England its

A: C...A...P

H: Yeah

A: Yes it isn't much, but really if there hadn't been a subsidy in agricultural farming, you see it is very laborious, and the work that has to be done, it is more expensive, we could not be profitable. The yields in kilograms are less than normal farming, then the subsidies are necessary, specially, well, this year they are less necessary. But previous years, the prices paid to the farmer were very, very low.

-For example, one kilogram of oil about €1.70-1.80, you need many kilograms of olives to make a kilogram of olive oil. But now, its better, one kilogram of oil is about €3 more or less, almost doubled. Of course, the problem with subsidies, one of the problems is if the prices are too low then it cannot be justified, it is not profitable. However at €3, yes, I mean that is the justification of the subsidies, in order to be able to produce a highly specialized crop, you need more money than with traditional farming, like the big industrial farms. The prices of the product are really low, you need money to do the job.

How would you like the subsidies to be? Eh? I do not understand?

H: Is that what I says?

A: For oil, olive oil, now this year 2013. In 2012 there were €1.70-1.80, that is 2012. In 2013 €3.

H: Yeah

A: 2009, 2010, 2011, 2012, this is very little, low price. 3 euros is acceptable for it to be profitable. How would you like the subsidy to be? I don't understand, I don't know what it means. The subsidies in my opinion should be given to those products that are hard to be profitable, organic is much harder labour hours, costs me more, then they might be supported by the European Union, the government or the region.

My opinion is that if the products have a fair price, that they are profitable with the work being done, then you wouldn't need the subsidy. But, when you have really low prices, if you don't have a subsidy you cannot continue. Of course this doesn't fly. When it is 3 euro, it is profitable, you can more or less function. It is a problem.

H: Oh yes, I understand.

A: My life as a farmer is like a hobby.

H: Not professional.

A: Yes, but I do not have to, I do the work as a type of entertainment, but for a proper farmer, life is very hard. It is very laborious, the work is hard, it is hard to do. It is very hard to be a farmer; and also, farmers are assumed to be low class, I hope that changes one day. The best part is that I enjoy it, I like doing it, and I have the time to do it, the worse is when nothing grows, when there is a plague or a disease or a catastrophe; when you work and you don't produce anything and you have no money to go on. That is the worse. The future of agriculture in my opinion, in Spain, we have always been an agricultural society. However, with the competition coming from countries such as the ones in North Africa, Morocco, and Tunisia for example. With that competition farming has suffered a lot, it is not profitable as their prices are really low. The competition coming from Morocco and the Maghreb are very competitive, labour is very cheap. Then they lower the prices for us Spanish, well that hurts us, you have to focus on quantity rather than quality to get the best prices.

The current topic of the crisis and all that is making a lot of people turn to farming, because there is nothing else. Other jobs are hurt, and then many people are working as labourers and farmers. Other entrepreneurs start setting up their own ventures. Then the future of farming in Spain, I think that these circumstances won't hurt it, it might even improve it, and with so many crises in other sectors it might make it work better.

Right now in Spain, what is pulling the economy along is exports, primarily agricultural exports. Here we don't have much industry, mainly services and agriculture that is what is driving the economy. Then I don't think that due to that the future for farming is bad. I am happy the way it works, but with the troubles I have mentioned and the low prices and the subsidies, because if not it won't work. We would have to close agriculture.

The End, many thanks for letting me talk, have a lovely afternoon!

H: Oh yeah brilliant.

A: Thank you

H: No really, thank you.

END OF INTERVIEW

6. Jaun; Uleila del Campo

H: Interviewer

J: Smallholder organic-olive oil producer

BEGINNING OF INTERVIEW

J: Because I have inherited this farm from my father, he passed away not long ago. What do I like about agriculture? Well that it is the best! Because it is the most relaxed. The most relaxed, natural, non-stressful. You are always in touch with nature, you see how things grow.

U: I think organic is more difficult to employ. It's easier with non-organic. I think that's the reason non-organic is more common. The biggest problem? The biggest problem is economics, no doubt. The prices of our products are not competitive. Economics no doubt. Fertility? No idea. To keep it in the same level? With fertilizer? I don't know how to improve the fertility.

H: Yeah so quality

J: How to improve it? No idea, to keep it in the same level. Well difficult question. Maybe we are not in a position to reckon with that problem. Now economics is the biggest problem I think. Water and the ground, wells, we use irrigation all around the farm. Because there is not enough water to use another system, this is the best it is the most efficient.

J: I can tell you this in another way,

H: Yeah

J: the problem is an agrarian enterprise on a small scale that does olives and olive oil, or here in Almería, any type of thing, almonds. Nowadays with the soil that we have, which is not very fertile. The soil that we have here is not very fertile. It doesn't rain; it is very hard to grow olives, a lot of effort, money and work. This isn't paid, so people cannot live, there are very few people that live off farming. They have to live from something else, and they don't leave the land because they inherited it from their parents, and they have 100 olive trees and they look after them on weekends. And with the family they pick up stuff. That is that side of thing. Then there are larger farms, like this one, it is almost sentimental, because this isn't profitable and you make a huge effort. Say you have 6 steady workers year round, then you might be able to hire 20-30 people during the picking season 2-4 months a year. But if I didn't do that then people would have to move away.

H: Yeah I get that small bits, like your family as well it's sentimental and they keep coming back. I can translate this in full yeah no problem.

J: The idea is, economically speaking, it is not profitable if I had the money there are other places I could put my money and earn more. This is not a good business, it is not. So you tell me about organic and in-organic when this is green

H: Yeah

J: Obviously it's a problem, and here in Almería it's a big problem, it's a desert in Tabernas, here it is almost desert

H: Yeah

J: If you abandon the countryside, there is a problem that this will become even more deserted. And the soil won't be anything.

H: Done finished yeah

J: do you understand?

H: Yeah I think I do

J: So, because all of this is not a real way of life, well you ask someone who has a small farm of 5 hectares, they don't live off that, they live off the subsidies from the EU but they don't live from the product made in their field. SO a person that doesn't live from that, ask them to think in the possibility that the soil is more or less fertile... the thing is it will be a problem 50 years from now, but the president who is in now will not be here 50 years from now. But 50 years from now no one will be here if this isn't sorted.

H: Yeah

J: They will die before, I'm pessimistic.

H: My research, I'm not trying to get a yes or no answer, I'm not trying to prove anything, I'm just interviewing people to find out what is happening, bring that back and say this is the problem. I don't have an opinion, I don't have a view, I want your answers from the heart.

J: Right

H: I'm not writing organic agriculture is this, industrial farming is bad or good. I'm just saying what the problems are, what are the challenges. There are is no personal agenda for me.

J: But you are studying this place, this region. Sure the answers are not the same here than in Murcia. It is different or 100 km to Granada, absolutely different, but this is semi-desertic. What are we doing here? You know? I mean in agriculture. This is really hard; it is not the right place to do this.

H: yeah definitely

J: We are fighting against nature here

H: the water and the soil and the heat

J: It's like trying to; the climate is the same as in Tunisia, or north of Morocco. Comparing the two regions, two problems, are the same. Which is the difference, maybe here we are more, we have more power in economics now. Maybe 50 years ahead in the future, maybe these changes. But this interview about agriculture, what is the word, tomatoes, with the greenhouse, absolutely different.

H: Almería

J: Here, I don't know how to say it in English, greenhouses. They make a lot of money.

H: From satellite from space, you can see that. You've seen.

J: so here they have for example the water, they have a problem with water, the ground, no problem with the ground. Economics, no problem with economics.

H: do you think that's good to Almería province, good to Spain financially?

J: This? Sure!

H: What about environmentally though? The environment?

J: The environment, no, it's a disaster.

H: What about when people come to work here from Tunisia or Morocco, is that good for social, for people, Spanish people, is it good bad?

J: No, no problem, now that there is a crisis? I don't think there is a problem. I know that because I work here. I know the reality.

H: People, Spanish people, is it good bad or no problem.

J: No problem, taking jobs. Now there is a crisis but I don't think there is a problem.

H: INAUDIBLE

J: I know that because I work here

H: Oh yeah? It's your place?

J: So I know the reality, it's absolutely different.

H: Yeah completely different

J: this is like an industry.

H: Just economics

J: Yes

H: In the UK in England, I've gone to the supermarket and I've seen Almería

J: Yeah it's here or *** this region and this region. But it's a matter of vegetables,

H: Yeah small, vegetables tomatoes... In Spanish would be fine

J: Cucumbers, peppers, tomatoes, green beans. So if you are studying Geography, the population, this is, there is no people living here, it is quite empty. But here there is a city of 100,000 people. And here roquetas de mar 100,000 too.

H: Unbelievable, all working in here

J: So compare this with this. In uleila del campo maybe 1000 in ***. Lets say Uleila 100, no 1000, tabernas 1500 maybe. And it's climate.

H: I understand that's completely different to what I think when I drive past here you can see, go to Nijar as well you been to nijar?

J: Yes

H: There's another one called

J: campo hermoso

H: I've been there as well all plastic

J: All this is plastic, and here is a natural park. And all this plastic, the other place plastic, here is the Tabernas desert. And here in the middle are these kind of people with the olives. And these fighting against the climate it's another thing.

H: The people fighting the climate, why do they stay here? Is it a family tradition or no choice economically?

J: No, choice yes sure, it's a matter of my roots, I was born in Barcelona. But my father was born here, this is my place. I like to do my best for my place. If we abandon this then there would be no nothing, no animals, nothing. It is all laid to waste and people go. They emigrate.

H: They emigrate yeah, migrate. You've got a beautiful home here, really nice.

J: Well around here there is people from great Britain,

H: They live here?

J: Yeah they live here, there ar families living here. But right here next door.

H: Is it Lubrin?

J: No Lubrin no.

H: The tapas bar?

J: Yes

H: But there are more, many more, more people here, British, yes loads!

J: Next door there is Silvia and Bill, they're here 5 minutes walking. There are many living here.

H: So there

J: INAUDIBLE They are here yes.

H: Yeah. There's no internet so it won't go detailed

J: No no problem, there lives Charles and in another place on this road there is a bar and the owners are Maria and Chris, they are from England.

H: Oh really?

J: Yes there are many British, other people that are older and retired. Yeah I understand.

H: I am staying in Sorbas, you know the Urra field centre? Behind the caves like a hostel or a research centre for students. The lady is called Lindy Walsh, she has been here 100 ears, 200 years. A long time

H: Hope that it's like yourself and so far it's been really good, really helpful, and I speak to farmers, really passionate, they enjoy talking about their farms and the land and the people, yes really good, really friendly as well.

J: I think there are around the world the same kind of people, in your country the farmers all similar.

J: So how did you get to think about Almería?

H: I came here in October

J: But why? This is the other side of the world

H: Because in Almería, my teacher, my lecturer, Professor, he has researched here for 20-30 years, a long long time.

J: 30 years, in the 70s?

H: Yeah he's 60, what a change!

J: He's more concerned about the rocks, soil, vegetation.

H: But before we went you know to the solar, electricity, the tower, up to that. And we looked at water harvesting, the water museum in Nijar, we had a look around the whole place. We went to Oro del desierto, Rafael Guy.

J: Rafael Uveda, yes, I know him.

H: You know him?

J: yes I know him

H: Yeah, and I just liked what he did and the farm that he's got, everything works, it's like a circle, no waste. Long term it is ecologically friendly, but he's got the luxury of doing that, he's got his dad and his granddad the knowledge. He's got the technology as well, some farmers they are not in a position to do that.

J: You need money

H: Here is one example, this is for my dissertation, my final piece of work, so I wanted to come and see what issues farmers are facing. This is a grounded theory, I've got no agenda,

no yes or hypothesis, just what's happening and then explain and describe what's happening.

J: What is happening, you know what happens.

H: yeah, money is a big problem.

J: But your lecturer, I think he knows Almería in the 70s, there is no comparison, it has changed like day and night. A radical change.

H: No motorway

J: No nothing, no telephones, no electricity. Here in Uleila there was only one phone in the 60s, no in the 70s! This was Almería in the 70s. This wasn't here; there were no farms, there was nothing.

H: See things change

J: Rafael in Tabernas, we were already here when he planted his olive trees. He used to come around here.

H: I have his card, his business card, but you know the guy yeah?

J: Yeah Rafael Uveda, yeah. Yes, the gold of the desert.

H: Yeah same guy

U: Yeah the father, the elder.

H: I only spoke to Rafael Alonso Aguilera, he was very good, very honest. He said the problems are there, but he told me that some people steal his olives, only a small amount.

J: Very important

H: yeah

J: We fight against the disease, not prevent it. Vulnerable to competition from large industrial olive-oil producers? The world market is what is hurting us, big companies, of course they hurt us, and we are all vulnerable.

J: What's the meaning of the question? People that work here, capability or something?

H: You can skip that question, it's more about do your employees have the same mind as yours, production or organic or non-organic or do they just come to work and leave?

J: Yeah second answer. I believe yes, the answer to question number 9. It is a problem, resource depletion, yes it is, it is sure. This is like... this is Almería.

H: Always

J: Money from the European Union yes, the PAC, Common Agricultural Politics yes. Another from Spanish government, No.

J: How would I like agricultural subsidies to be? I don't like them. Now it's necessary but I don't like them, I prefer that the business was profitable. I don't like the idea of being helped.

H: I understand

J: I prefer that this was profitable, that you could stand on your own.

H: If you want to express yourself in Spanish in full feel free.

J: Simply yes, the subsidies from the EU are necessary, because without them this would be closed. The countryside would be abandoned because it is not profitable. What I would like is for it to be profitable, that people could live from their own work, from the products they sell. In this case olive oil, well it should be worth accordingly so I could pay my workers, make some money, you don't need to make a lot of it. But the way the economy is, you lose money. That's where the subsidies come in. They are a short term solution, right now I am helping you by giving you money, but I am not solving the problem.

J: Life as a farmer?! Well, I am not a 'farmer', I own this place but I do not work here all the time. I work from an office, so I am always sitting down at a desk. When you work in the country side you live much better, not locked up at university studying.

H: Yeah brilliant

J: Yeah there you go. Do you want my email?

H: Yeah if you want me to email. I can give you my report when I finish. This is for my studies for my dissertation, my final piece of work. My degree is geography really and business together.

J: That is almost anthropology.

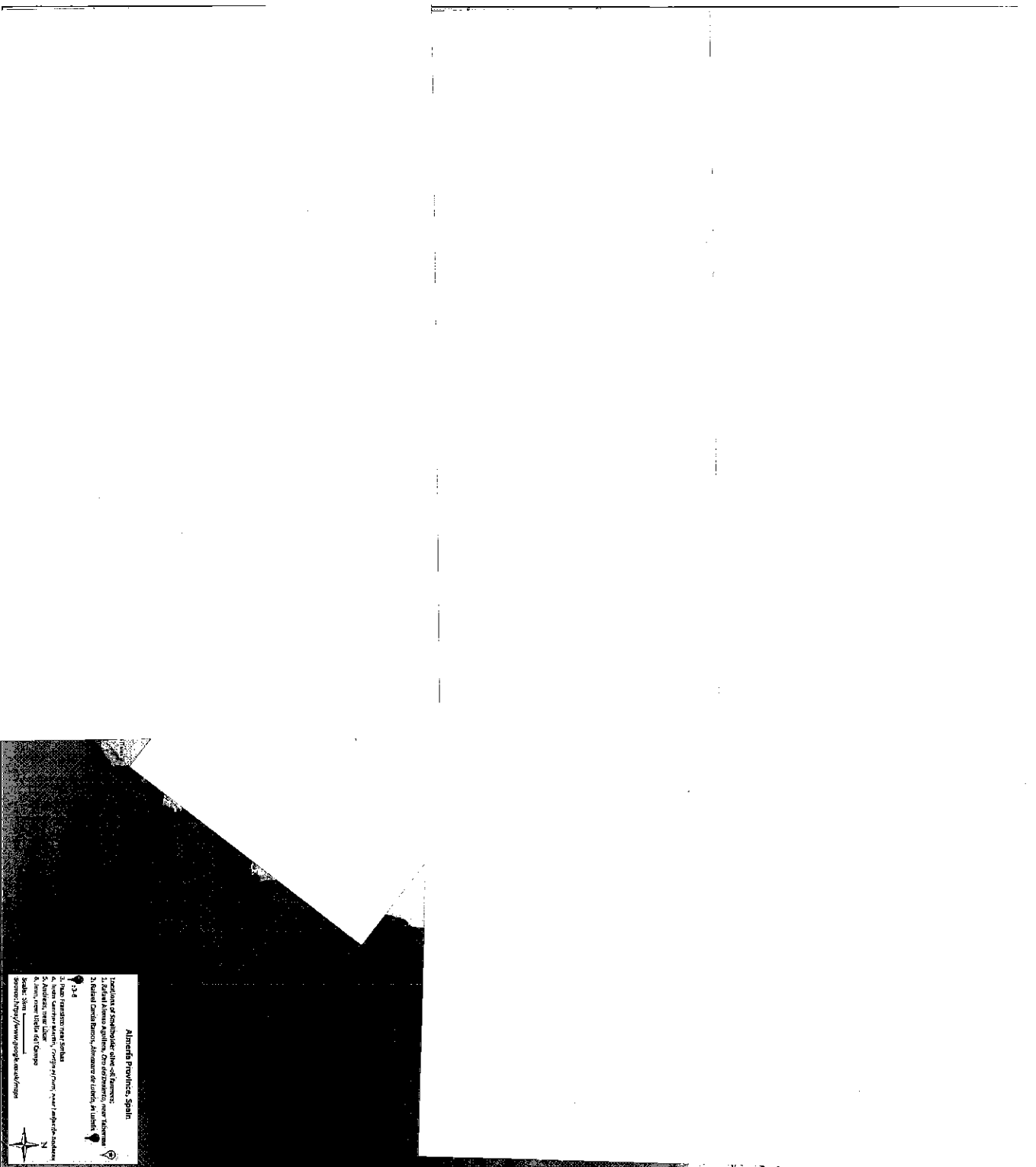
H: thank you very much for your time, I really appreciate it, what was your name again?

J: Juan Julian

H: Juan... Julian

J: Yes

END OF INTERVIEW



Appendix 4. CAAE guide on organic farming

GUIDE TO THE ECOLOGICAL CERTIFICATION

General Information -

What is organic farming?

It organic production is a system of production agriculture, livestock and food, protected by a European standard. This standard is published in the form of the European Union Regulation (Regulation EC 834/2007 and its implementing rules). Its content combines:

- Best environmental practices
- A high level of biodiversity
- The preservation of natural resources
- The application of animal welfare standards
- Produced in accordance with the preference of certain consumers for products obtained from substances and natural processes.

Thus, ecological production methods play a social role double, providing, on the one hand, eco-friendly products to a specific market that responds to the demands of consumers and, for another, public goods that contribute to the protection of the environment, animal welfare and rural development.

Why to produce organic food?

Organic farming is a modern production system, whose main objective is to obtain maximum quality food, which strives to protect the environment and to foster rural development. It also allows to respond to the new demands of consumers who are looking for healthy food and recognize the efforts of farmers which, with their professionalism and commitment, care for our food and our natural heritage.

With these products you get a differentiation, this gives them a better position in the global market, by giving them a higher value. This way allows higher incomes for producers and an increase in the competitiveness of the companies.

In addition, there are agri-environmental aid that provides management for ecological farmers (farmer, rancher or beekeeper) which are registered in a certification body authorized as the C.A.A.E. certification service and which are compatible with other aid may be receiving.

What are the fundamental principles of organic farming?

Organic production is based on the following principles:

- + Use of the natural resources, living organisms and mechanical production.
- + Both the development of crops and how livestock production not be seen independently to the ground.

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If necessary the text can be found full of these documents to the C.A.A.E. certification service. G.B. General. Must anticipate the risks and take measures that protect / prevent these risks.

- + The use of inputs and raw materials from external source, both of ecological production, as derived from natural substances or natural substances is limited.
- + Cannot be used modified organisms genetically (GM), as well as products obtained from them.
- + Ionizing radiation cannot be used for food or feed, or for raw materials used in food or organic feed.

What products can be certified under the CAAE brand?

The C.A.A.E. certification service provides services for the full range of products included in the European legislation on organic production: unprocessed agricultural products of animal or vegetable origin; Processed agricultural products of animal or vegetable origin intended to be used for human consumption; Feed; Vegetative reproduction and seed material for cultivation; Yeasts intended for consumption or feed; Products of organic aquaculture (animals, algae and mollusks).

The products of hunting and fishing of wild animals shall not be considered organic production.

The regulation applies to activities at any stage of production, preparation and distribution relating to products for which certification is requested.

When you apply for certification?

At any time of the year you can request certification. However, you should know if you are interested in applying for subsidies which grants administration, there limits to do so (coinciding with the deadline for submission of PAC supports). For more information, you can contact the C.A.A.E. certification service or consult our web site www.caae.es

Where can you address to apply for certification?

You can apply for certification by phone, by fax or by email (see contact details on our website). If you prefer you can contact our offices and we will attend you personally within our broad business hours of morning and afternoon.

What documentation is present?

-Model "Certification request". This model can be downloaded from our website or request it by contacting with us so we send it down the Middle showing us (fax, mail or email). Once in his hands must complete those sections and annexes that are related to the type of activity that you want to certify.

- Documentation: Together with the application, you will need to submit a supplementary documentation. The document 'Indications for registration', which we'll send you for procedures, indicates which is the documentation that must be submitted. If you have any questions regarding filling or shipping please contact us.

- Does cost certification?: When you apply for certification you will be a budget with the cost of our service, so it will be available from the very beginning the cost of certification. The payment of the cost of the service must be at the time of registration so we can start the review process. To continue with the certification, you will need to renew their commitments annually by payment of renewal.

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It is necessary to know, that once payment is made, the certification process starts and will therefore not be returned any amount even if you request the cancellation of the process.

How is processed your application for certification?

Upon receipt of your request, we will record your details and we will send you a letter as acknowledgment of receipt of your request.

The speed of the review process depends on the State of its documentation. The simultaneous delivery of all the documentation required, it will expedite the process.

The documentation received, will be revised and in cases where is not correct or incomplete, our staff will get in touch with you so that you can resolve it.

Once the review will receive a letter with the result.

- If it is noncompliant documentation will be correct and will continue with the certification process.
- If it is not in conformity will mean that the issues identified in the documentation, being able to file the application, have not been resolved if they are not solved finally.
- If communicate you that it is pending, is because he is missing some information that can be completed during the visit.

When is the technician's inspection visit carried out?

Once the review of your application. For the visit he will take into account, among other variables, the best time depending on the crop. In the same letter that communicates the result of the review, will be announced that a technical inspection, will contact you to specify the day and time of the visit.

To ensure a total impartiality in the work of our staff, we give the opportunity that objects to the inspector for a cause. On our website you can consult the listing of technical inspection, as well as a series of instructions for the visit.

What is the visit of inspection technician?

Inspector will come to the farm and/or facilities subject to inspection and check the production process, will evaluate the system used by you to ensure compliance with the requirements, will perform a visual inspection of all parts of the estate or of the industry and, in cases where it is necessary, will carry out a test sample.

At the end, will reflect the result producing an inspection report and where relevant reports of taking samples or non-conformities, of which a copy shall be delivered to him.

What should do if the inspection technician find any non-conformance?

If the technician detects any conformity does not mean that it must improve any section of its system of self-control or production system.

Importantly, give a proper treatment non-compliance, which must: 1) find the cause that has led to the emergence of the problem; 2) locate part of its system of autocontrol (records) or its production system (plot, product, livestock,...), has been affected; 3 ^º) Propose measures which are effective to correct the problem within a certain time.

What happens with the samples that the technician take?

First must know that is not always necessary to take samples. In General, samples are taken when you will get your certification with the category of agriculture Note: this guide is a non-exhaustive summary of the contents of the PGT-01 (certification process) and regulations reference RCE 834/2007 (and its implementing rules), developed to facilitate access to the core content of the requirements. If necessary the text can be found full of these documents to the C.A.A.E. certification service. G.B. General Rev.01 14/07/11 page 4 of 5 ecological, when there is a suspicion or risk of contamination of the production or random monitoring.

Where the inspection technician get a sample in his farm or industry, this will be sent to an accredited laboratory, as a maximum guarantee in the analysis. When the result is received you will be notified in writing. If the analysis detected the presence of residues of forbidden products, not conformity, which would have to give treatment would be opened.

Who reviews the inspection report?

Inspection technician sends the inspection report and the rest of the documentation for your records to our office, there is reviewed first by a certified technician who prepares them for the Commission of certification.

The Certification Commission is a collegiate body that decides and issues a decision on certification. Decisions can be favorable (to grant the certificate), weak (to deny the certificate) or postponement (to request documentation or to perform an additional visit).

When you issue the certificate to sell their products as organically?

In the event of a favourable decision will be issued the corresponding certificate to sell their products, provided that requirements relating to the conversion periods are met. You will have your certificate with the category that corresponds: organic farming, in Conversion; more or less 95% of the ingredients of agricultural origin, ecological, or ingredients of hunting or fishing.

If the Certification Commission decided to postpone the certification, you will be asked to adopt measures so that the remaining deviations are resolved.

In all cases, you will be communicated the result of the decision in writing.

Once resolved issues preventing a favorable decision on the initial visit, will be given for completed the registration process.

Long the validity of your certificate?

Once issued the certificate, this will be renewed each year with the annual visit. To avoid that the certificate expires before the next visit, the validity will be until 31 December of the following year or until he is issued a new one.

How and where can employ CAAE mark it?

Both the CAAE brand, the logo community as indications (ECO, BIO, organic, biological), can be used only when it has the certificate in force and for the products covered by the certificate.

You can use these marks and indications on labelling and advertising (in any medium), provided that it is clear that it refers to products that has certified.

To be sure the CAAE Mark uses it correctly can consult our Web graphic identity Manual. Information note: this guide is a non-exhaustive summary of the contents of the PGT-01 (certification process) and regulations reference RCE 834/2007 (and its implementing rules), developed to facilitate access to the core content of the requirements. If necessary the text can be found full of these documents to the C.A.A.E. certification service. G.B. General 14/07/11 Rev.01 page 5 of 5

Guidance for certification

ORGANIC PLANT PRODUCTS

What is the conversion period?

It is the period of time that must elapse to ensure that possible residues in soil and crops have disappeared. The existence and permanence of these wastes will depend on management that has been previously on the plots. The duration of the conversion period is established in the European regulations of organic farming as follows:

-Whether it's annual crops (vegetables, cereals, etc.): the conversion period shall be 2 years until the sowing, i.e. will be considered organic products that have been planted 2 years after the conversion of the plots.

-Whether it's perennial crops (olive groves, fruit trees, vineyard, etc...): the conversion period is 3-year-old to harvesting, i.e., that shall be considered organic products that are collected from 3 years of having started the conversion of the plots.

The legislation includes special cases in which the conversion periods can be reduced. This is must be able to prove, during the period prior to the registration, unauthorized products have not been applied. If you are in this case, let us know at the time of registration and we will inform you of the procedure and conditions to meet.

You should know, that if after the conversion period are still detected in soil or plant residues, this conversion period can be extended.

What material should be used for seeding and planting?

Both vegetable seedlings, seeds (and potatoes for planting) and (claws, stolons, grafts) vegetative reproductive material must be organically produced.

As an exception, you can use vegetative reproduction not ecological material, if it is not available in the market as ecological. In the case of seeds, for use of non-organic origin, must request, before each planting, an authorization to the C.A.A.E. certification service.

How to fertilize the soil and feed crops

All the techniques that use should prevent or minimise any contribution to the pollution of the environment.

Only fertilizers and soil conditioners have been can be authorised for use in organic production, not being able to use nitrogen mineral fertilizers.

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of these documents to the C.A.A.E. certification service.

The practices of tillage and cultivation, must be oriented to maintain or increase the organic matter, the biological activity of the soil, enhance soil stability and biodiversity and prevent compaction and soil erosion:

+ You must apply multiannual crop rotation. To the extent possible, as the crop cycle is appropriate, include some improver cultivation such as legumes, green manures or. In addition to apply animal manure or organic material, preferably composted and organic production.

+ Hydroponic production (crops that are used instead of soil substrates) is not permitted in organic production, except mushrooms, seedlings and watercress.

+ If you use livestock manure, the maximum total amount extended on the farm may not exceed 170 kg of nitrogen per year per hectare of agricultural area used.

This limit applies only to the manure from farm dried farmyard manure, dehydrated manure, mulch of solid excreta of animals (including manure), liquid animal manure and composted manure.

+ You can use micro-organisms preparations to improve the General conditions of the soil or the availability of nutrients in the soil or crops, prepared appropriate herbal or preparations of micro-organisms for the activation of the compost and biodynamic preparations.

+ Growth regulators and chemical synthetic hormonal products cannot be used.

All the techniques that use should prevent or minimise any contribution to the pollution of the environment.

How to control pests, diseases and weeds?

Prevention of damage caused by pests, diseases and weeds must be based mainly in the protection of natural enemies, choice of species and varieties, crop rotation, cultivation techniques (brush cutters, cultivators, stands, pads, biofumigation, ventilation, protective meshes,...) and thermal processes (burners, solarization,...).

The main pests like caterpillars, aphids, thrips, leafminers, spider mites, nematodes, diseases such as rust, fusarium, powdery mildew, virus, rots, and..... can be controlled with a combination of these techniques and products.

How to identify / label products leaving the farm?

Labeling concept, is broader and not only refers to the label attached to the packaging, but it also includes invoices, documents accompanying, and in general, anything that serve to identify the product.

According to the phase in which its certification, the products need to identify with the following indications:

"Non-certified products" products collected during the first 12 months from registration and with non-compliant products 'Products with certification in conversion' products collected during the conversion period of 2 or 3 years depending on the type of crop "Products certified for organic production" products harvested after the mention of conversion to the organic production method

It can not use any mention of ECO, BIO or derived in this type of product. You have to sell them and label them as other non organic products.

The mention of use is "Product in conversion to organic farming". All letters must be of the same format, size, and color.

The mention of use is "organic production", "Green", "organic farming". Identification of the control body

You may not use any reference to the inspection body, nor the CAAE brand logo

You have to include the logo accompanied by code ES-ECO - 001 CAAE in conversion - AN (for Andalusia) and ES-ECO - 001-CM (for Castilla-La Mancha)

You have to include the CAAE logo accompanied by code ES-ECO - 001 organic farming - AN (for Andalusia) and ES-ECO - 001-CM (for Castilla-La Mancha) identification of the producer

You must include your name and address

You must include your name and address lot identification

It should include a number of lot that allows ensuring the traceability of the product

It should include a number of lot that allows ensuring the traceability of the product Community logo

Cannot use you EU logo

You can use the EU logo, accompanied by the mention of "EU organic farming".

How packaging, transporting and storing the products leaving the farm?

If you are using media collection, transport or storage, that are shared with non-organic products in conversion, has to take measures of separation, cleaning and identification, to avoid mixing types of products, contaminated or replaced.

If you are transporting products to other organic operators (for example to an ecological industry) or sell directly to the final consumer, open containers can be used.

If it is sold to a non-eco-friendly operator (for example, a supermarket), you have to use containers that prevent the substitution of its content.

When products are collected, transported, or stored in other units, they must be accompanied by a document or label which included mentions of labelling that apply.

If you receive a raw material (such as seeds or seedlings) of ecological origin you should check the closing of the container (if applicable) and the contents of the tag that accompanies it, before you can use them.

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The CAAE Association has produced a guide of industries classified by type of products that will facilitate the location of potential buyers of its production.

Requirements and control measures should be met and taken?

When you apply for certification, should be included in the model of application, among other things, information concerning the "description of the farm", "Description of operations" and "Description of the measures" to reduce the risk of contamination. You must also have the planes of his farm and log operations (with dates of operations performed and areas or affected plots). If any modification is made in this information, please inform us.

The production has to be identified through a system of divided in such a way that allows ensuring the traceability. Purchases of raw materials and supplies (seeds, fertilizers, plant protection,...), must register showing at least the quantity, type, provider, and use. For stored products or in existence you must register them in the same way. Sales of their products must be registered, indicating at least: quantities, recipients, type of product and its category (ecological, conversion or not eco-friendly). For stored products or in existence you must register them in the same way. When it considers or suspects that a product has been produced in breach of any of the requirements of the standard, you should avoid that affected production is marketed with references to the organic method, except that the suspicion to dissipate. The detection of this type of problem can conduct of an inspection, the claim of a customer (or recipient) or internally by yourself, must be notify the C.A.A.E. certification service. If the affected production was marketed please inform the recipients so they can take action and paralyze.

They must also keep packing slips, invoices, labels, and other documents that justify the purchase, sale and use of inputs and acquired raw materials and products leaving the farm.

When you receive an inspection by a technician of the C.A.A.E. certification service, you have to allow him access to all areas, facilities, machinery, etc., both of those dedicated to organic to non-organic production and provide an orderly generated records.

Fertilizers and soil conditioners

Denomination	Description, compositional requirements, and conditions of use
Farmyard manure	Product made by blending of excrement of animals and plant material (bed) Coming from an agricultural production system in which stocking is equivalent to the number of animals that produce a maximum of 170 kg of nitrogen per hectare/year referred to in annex IV Forbidden the origin of intensive livestock
Dried manure and dehydrated poultry manure	Coming from an agricultural production system in which stocking is equivalent to the number of animals that produce a maximum of 170 kg of nitrogen per hectare/year referred to in annex IV Forbidden the origin of intensive livestock
Litter of solid excrements, including manure and composted manure	Coming from an agricultural production system in which stocking is equivalent to the number of animals that produce a maximum of 170 kg of nitrogen per hectare/year referred to in annex IV Forbidden the origin of intensive livestock
Liquid animal excrements	Use after appropriate dilution or a controlled fermentation Coming from an agricultural production system in which stocking is equivalent to the number of animals that produce a maximum of 170 kg of nitrogen per hectare/year referred to in annex IV Forbidden the origin of intensive livestock
Household waste composted or fermented	The product obtained from household waste separated based on their origin, subject to a process of composting or anaerobic fermentation for biogas production Only vegetable waste and animals only when they occur in a closed and guarded, accepted by the Member State collecting system maximum concentrations in mg/kg of dry matter: cadmium: 0.7; copper: 70; Nickel: 25; lead: 45; Zinc: 200; Mercury: 0.4; chromium (total): 70; chrome (VI): 0
Peat	Use limited to horticulture (growing of vegetables, floriculture, Arboriculture, nursery)
Mulch from crop of mushrooms	The initial composition of the substrate must be limited to products of this annex.

Dejecta of worms (worm humus) and insects	
Guano	
Mixtures of vegetable composted or fermented	Product obtained from vegetable mixtures, subjected to a process of composting or anaerobic fermentation for biogas production
Products or by-products of animal origin listed below: -blood meal, dust of hoof, powder horn, powder of bone or bones powder desgelatinizado, fish meal, meat meal, Feather meal, wool, clumps of hair and skin, hairs, dairy products	Skins: Concentration maximum mg/kg of dry matter of chromium (VI): 0
Products and by-products of plant origin for fertilizer	Examples. flour oilcakes, shell of cocoa and malt rootlets

1. Substances of vegetable or animal origin name	Description, compositional requirements, and conditions of use
Azadirachtin extracted from <i>Azadirachta indica</i> (neem tree)	Insecticide
Beeswax	Agent for pruning
Gelatin	Insecticide
Hydrolysed proteins	Attractive only in legal applications in combination with other products appropriate for this list
Lecithin	Fungicide
Vegetable oils (e.g., peppermint oil, pine oil, caraway oil)	Insecticide, acaricide, fungicide and germination inhibitor
Pyrethrins extracted from <i>Chrysanthemum cinerariaefolium</i>	Insecticide
Quassia extracted from <i>Quassia amara</i>	Insecticide and repellent

2 Microorganisms used for biological control of pests and diseases denomination	Description, compositional requirements, and conditions of use
Microorganisms (bacteria, viruses and fungi)	

3 Substances produced by microorganisms denomination	Description, compositional requirements, and conditions of use
Spinosad	Insecticide Only if measures are taken to minimize the risk of parasite resistance development and important

4. Substances to be used only in traps and/or dispersing denomination	Description, compositional requirements, and conditions of use
Diammonium phosphate	Attractive only in traps
Pheromones	Attractive; disruptive sexual behavior; only in traps and dispersers
Pyrethroids (deltamethrin-only or lambdacyhalotrina)	Insecticide; only in traps with specific Attractants; only against <i>Bactrocera oleae</i> and <i>Ceratitis capitata</i> <i>wied</i>

5. Preparations for their dispersion on the surface between naming cultivated plants	Description, compositional requirements, and conditions of use
Ferric phosphate (orthophosphate of iron III)	Molluscicide
6. Other substances traditionally used in organic agriculture designation	Description, compositional requirements, and conditions of use
In the form of copper oxychloride, copper hydroxide, copper sulfate tribasic copper, cuprous oxide or copper octanoate	Fungicide; Up to 6 kg of copper by has and year Notwithstanding the provisions of the preceding paragraph, in the case of perennial crops, Member States may provide that the limit of 6 kg of copper can exceed during a given year, provided that the average amount used effectively during a period of 5 years covering this year over the previous four years does not exceed 6 kg.
Ethylene	Desverdizado of bananas, kiwis and persimmons; degreening of citrus fruits, only when it is part of a strategy to prevent fly damaged citrus; induction of the bloom of the pineapple; inhibition of sprouting of potatoes and onions
Salt of potassium rich in fatty acids (soft SOAP)	Insecticide
Sulphate of aluminum and potassium	Prevention of ripening of bananas

(kalinita)	
Calcium polysulfide	Fungicide, insecticide, acaricide
Paraffin oil	Insecticide, acaricide
Mineral oils	Insecticide, fungicide Only for fruit trees, vines, olive trees and tropical plants (for example,-bananas)
Potassium permanganate	Fungicide, bactericide; only for fruit trees, olive trees and vines
Quartz sand	Repellent
Sulphur	Fungicide, acaricide, repellent

Appendix Risk Assessment



RISK ASSESSMENT

Fieldwork Details	
Location Almeria Province, South East Spain, Europe.	
Date(s) of Visit	Outline of fieldwork activities
1-15 July 2013 08 July 2013	Conducting personal interviews with smallholder farmers and collecting case study evidence at Oro del Deserito olive oil farm.

Are you staying at a study centre? **NO**

If **YES**, please collect the appropriate assessment sheet from the Dept. Office.

Is your fieldwork abroad? **YES**

Does your fieldwork involve you using the premises of another organisation or business? **NO**

If **YES**, please collect the appropriate assessment sheet from the Dept. Office.

As the supervisor of this research project, I agree to the fieldwork detailed taking place and am satisfied that all necessary arrangements have been made to ensure that the event is successful, safe and is not likely to bring the University name into disrepute.

Signed (supervisor):

Print: DR. Simon Adderley

Date:

Site Risk Assessment

Site: Almeria Province, Grid reference: N/A

Date(s) of visit: July 1st – 15th 2013

South East Spain

Risk Assessment carried out by: Henry Sidsaph

Date of assessment: March 18th 2013

Specific hazard	Likelihood score	Severity score	Risk score	Specific control measures
Hot weather Injury	3	3	9	<p>Appropriate clothing, footwear, food and drink plenty of water</p> <p>Immunisations up to date, wash hands regularly, make sure water sources are clean</p> <p>Stay to public roads and let others know of my travel plans, mobile phone, stay in public places when alone</p> <p>Do not draw attention to myself, be polite and well mannered. Stay with local assistance where possible</p> <p>Take care when crossing roads, wear seat belts, be vigilant.</p> <p>Back up collected data where possible</p>
Illness	3	3	9	
Abduction	1	5	5	
Harassment	3	2	6	
Road Traffic Accidents	2	5	10	
Loss of equipment	3	1	3	

Emergency Services: SPANISH ES

University of Chester: 01244 511000

Nearest phone: +00 0000000000

Nearest Doctor: N/A

Nearest hospital: Almeria

City Hospital

Landowner contact permission: N/A

Student signature:

Date: